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COLLISIONS AT SEA.

RAILWAY trains move on a narrow track from which they may not diverge. Ships have the boundless ocean for their course. To this is it perhaps due that the measures taken to insure the safety of the former are so much more complete than those adopted for the latter.

The terrible frequency of marine disasters is well known to even casual readers of modern newspapers. Of the various accidents that send noble ships with their living freight to seek the depths of the ocean, few are more sudden, more swift, more overwhelming than collisions. Even in broad daylight the imperfection of human knowledge and skill often results in one of those terrible mishaps. How necessary, then, it is to strive in every possible way to decrease the additional dangers of night or of equally impenetrable fog!

To an ordinary traveler on the sea nothing may appear more simple than the rule of the road, nor anything less needful of cool judgment coupled with experience than the deciding which way to put the helm on seeing a red, green, or white light,—whether to luff, fall off, or brace aback; whether to simply stop or reverse the engine. That proper action, however, cannot be dictated by mere memorized rules is but too patent to all of us who have stood our watches at sea and been placed in a position to judge for ourselves. It is in the interest of the naval profession, it is in the interest of business, it is, above all, in the interest of humanity to devise the best possible means for a vessel at sea to indicate to another during the night or in thick weather her position and general course. That accomplished, professional training will have less difficulty in securing safety at sea.

It is proposed to give here a brief *résumé* of an excellent work

that has recently come under the writer's notice, entitled *Étude critique sur les abordages, par Louis Caffarena, Toulon*, 1876. Following the facts and suggestions drawn from the book in question are a few remarks designed to elicit opinions from those who may perhaps have made the matter the subject of more profound study.

So far it has proved impossible to trace back to a certain origin the laudable custom of providing sea-going vessels with position-lights. While no authority appears to state positively that they were not commonly exhibited by the very early navigators, a natural inference to that effect is drawn from occasional accounts of such precautions being taken in special cases, while, with such exceptions, no allusion is ever made to provisions of the kind, even in the most detailed accounts of naval constructions, voyages, or battles. The Egyptians, Phœnicians, Assyrians, and Greeks, all in turn advanced more or less in the arts of navigation, but no mention of such lights is found in any of their records.

It is very much the same with the Romans. In Virgil, especially the Æneid, there are many passages showing that except the weather was clear they anchored or hauled their vessels up on the beach during the night. In Livy, book xxix., chapter xxv., there is a passage wherein the silence on the matter is broken. Scipio, after assuring himself that the fleet was in every respect ready for sea, ordered that for recognition at night every fighting vessel should show one light, every transport two, and the commander-in-chief three. Other similar isolated narratives seem to render the general silence all the more significant.

During the first ten centuries of the Christian era the same obscurity continues to exist. The first vessel positively known to carry a light was a Norman ship, under William the Conqueror, in 1086; the lantern is shown in an engraving. But even since then many vessels are carefully described, and no mention is made of means taken to prevent collision at night,—not even in the fleet of eighteen hundred sail that assembled in Tunis Bay, under Louis IX., in 1260. In the seventeenth century the Venetians had their small vessels provided with three large lanterns at the stern. In France during the ministry of Colbert, when a vigorous impulse was given to naval matters, an ordinance of 1670 compelled the admiral's ship to carry four lights; a subsequent decree, in 1689, provided that of those four lights, three should be on the poop and one in the top. And so progressive steps were taken until the present system was reached a few years ago.

The number of collisions, however, far from decreasing in proportion to the means taken to prevent them, keeps on increasing. This is mainly owing, of course, to the continual increase in ocean traffic and in the speed of modern steamers, but it also shows that we are not keeping up with the increased demands on professional care and fore-

thought. The British Board of Trade furnishes the following table of collisions off the English coast alone:

In 1852 there were		57	collisions.	
" 1853	" "	73	"	
" 1854	" "	94	"	
" 1855	" "	296	"	(49 vessels sunk).
" 1856	" "	307	"	
" 1859	" "	323	"	
" 1860	" "	298	"	
" 1861	" "	349	"	
" 1864	" "	351	"	(263 at night).
" 1865	" "	354	"	(240 " ").
" 1866	" "	368	"	
" 1867	" "	414	"	(286 at night).
" 1868	" "	379	"	
" 1869	" "	372	"	

According to the English Lloyd's report, the average annual number of collisions throughout the world during the years 1866 to 1871, was two thousand one hundred and sixty-three, resulting in the sinking of one hundred and seventy-five vessels. This number only includes those that were insured, and also necessarily excludes a great many whose cases were settled without litigation. Perhaps two thousand three hundred would be nearer the mark.

Leaving aside the casualties resulting from professional incompetence or willful disregard of established rules, the causes that tend to bring about collisions may be summed up under three general heads, viz.: the insufficiency of the present system of running-lights; the insufficiency of the present international fog-signals; the lack of an international maritime penal code.

The present system of lights is insufficient in several ways. In the first place, they do not show in all directions from the ship. The masthead and side-lights, as is well known, illuminate an arc of twenty points, or from right ahead to two points abaft each beam. The remaining twelve points, or 135°, are without a friendly ray to warn an approaching stranger. So far as regards the exhibition of lights, vessels are either at anchor or under way, the latter term being equally applied to a steamer with her engines stopped and a sailing-vessel hove-to or becalmed. The speed of vessels under way then varies between 0 and 16 knots, and it is needless to say how often it happens that one vessel overhauls and passes another, whether one or both be steamers.

Does it not, then, seem rational to maintain that collisions are apt to take place under those circumstances as well as under others? They

are not so frequent of course, but in many places such accidents are liable to occur at any time. Take the Strait of Gibraltar for instance. How often do we see a hundred or even two hundred sail in sight at one time there, steering in with their yards squared to a light westerly breeze! Night comes on, perhaps with a slight mist, and by and by some huge steamer comes plunging along at the rate of eight to twelve knots, possibly fourteen. A vessel's sails cannot be seen very far at night when there is a haze and no moon; but, suppose that a remarkably bright lookout is kept, and that they are sighted at a distance of five hundred yards, a speed of twelve knots would put the steamer's bows aboard the ship becalmed in little over a minute. A minute leaves but scant time to decide which way to put the helm and to have the order obeyed. And then there is a possibility of fouling a second sail on the new course while all attention is being turned to finding out what that was just passed.

What are those sailing-vessels doing all this time? They see the mast-head light bearing down on them, they may even distinguish the side-lights, but they are powerless; becalmed, they cannot help themselves; even if they have steerage-way, the laws of some countries provide that the vessel passing another should steer to avoid her, and confusion might arise by both putting the helm the same way at the critical moment. The officer of the watch on board the sailing-vessel would naturally think of waving a light over the stern to attract attention as soon as he sees that a collision is possible. If he thinks of this expedient soon enough, and if his vessel is a man-of-war with two deck-lanterns under the break of the poop or elsewhere handy, and if the other is quick enough with his helm, it will be all right. But those ifs are three too many.

Article VI. of an international code proposed by Mr. W. Stirling Lacon in the British House of Commons in 1872, provided that in cases similar to the one just supposed the vessel whose lights are not visible should show a white light over the stern. The code was not accepted, but that one clause was appended to the then existing rules. Unfortunately, it was declared applicable only to the naval vessels of France and England. The instinctive use of a light in such a way seems in itself sufficient proof of the necessity of having one at the stern at all times.

As an illustration of the possibility of collision under these circumstances, the case may be cited of the steamer "Tanaïs" of the Messageries Maritimes. In February, 1872, while bound from Marseilles to Messina, she collided with an English bark, striking her on the starboard side. The latter was close-hauled on the port tack, and her lights (if they were in place, which was denied) could not be seen by the steamer coming up on nearly the same course. The Messageries company sued the bark for the damage done the "Tanaïs" on the plea that

the bark had no position-lights out; but verdict was given against them on the ground that even if she did not have her lights out, her sails should have been seen, and the "Tanaïs" should have avoided her. In this case the bark showed a white light over the stern, but too late to prevent the collision.

Among many other instances given it may be well to mention the sinking of the sloop "Lorenzo" by the steamer "Raphael," in 1875. The former was running with a fresh breeze well aft. The mate saw the steamer coming, and, knowing that his lights could not be seen, tried to attract attention by ringing the bell, which of course could not be heard against the wind. He finally showed a light, but it was too late. The steamer had to pay the value of the lugger and costs.

The chief objection raised to having a light for the twelve points now without it, is the increased expense in the equipment of merchant vessels. But that should not stand in the way one moment. Those that own ships and send them to sea should be compelled to submit to that trifling cost to insure the safety of their own goods and of others' lives. Should the law be enacted, though, there would probably not be very much growling. Most ship-owners would soon applaud it. Moreover, the expense need not be so very much greater, for the side-lights instead of being screened at two points abaft the beam, could be so fitted as to shine all the way aft, a plain glass being used for the rays thrown abaft the beam.

In this way, also, the range of the side-lights would be reduced to eight points, and the limit of error in estimating the course would be reduced from five points to four. If a colored light were seen bearing northwest, for instance, the stranger's course would be known to be between southeast and southwest if a red light, or between southeast and northeast if a green, without resorting to compass-bearings. A vessel whose colored light is seen is known to be standing somewhere between a straight course for you and that perpendicular to the direction in which his light is seen; in no case with a colored light showing could the stranger be standing away from you. Should the colored light change to white, the vessel is standing directly across; should the white light be seen right off, she is standing more or less away from you.

To avoid all possibility of confounding these stern-lights with a steamer's mast-head light, the range of which it is also proposed to reduce to sixteen points, or from right ahead to each beam, the latter may be modified by superposing a red light. This arrangement would also prevent the steamer's running light being mistaken for the stay-light of a vessel at anchor, a matter of no little importance in entering crowded harbors or fairways.

In this way no extra expense will be entailed upon sailing-vessels, and steamers will only have one more light to maintain,—a trifling item for them.

To decrease still further the limit of error in estimating the course of a strange steamer, the range of the upper red mast-head light might be limited to four points on each bow, so that its visibility or non-visibility would fix the course to within two points.

Another bad feature in the present system of lights is, that they are very apt to be screened by boats, rigging, or sails. Is anything more absurd than the sight of a fine, large ship gliding along before the wind, with side-lights burning brightly, and illuminating the leech of the foresail and the lower stun'sails? This does not happen very often; under these circumstances the clew of the foresail is generally raised a little, and other measures taken that may be thought proper to secure obedience to the spirit of the law. It is suggested to forbid vessels carrying lower stun'sails at night, but that seems an unnecessarily harsh measure. In the merchant-service those sails, being generally three-cornered, do not screen the light.

The present optional position of the lights, which is to be deplored for many reasons, has also a bearing on this very point. If placed well aft, they will not be screened through so large an arc by the stun'-sails, but may only show at all times from a point off the bow on account of boats, rigging, or sometimes the shape of the hull. If placed well forward, besides being hidden by the sails, they leave the after-part of the vessel exposed. The law should be rigid in stating the exact position of the side-lights,—how far from the stern, and how far outboard. An advantage in placing them near the stern would be that the white sectors that it is proposed to give them, and which in this case should have an amplitude of 180°, would be seen from both quarters, and the presence of two white lights there would prevent the stranger mistaking them for a mast-head light.

There is much fault found with vessels' lights at sea otherwise than from defects in the system. It often happens that the boxes are so placed that either light may be seen from off the other bow. This may result from the screens being too short, or from the centre of the light being too far from the screen. A rigid inspection previous to sailing would put an end to that difficulty.

It is also very seldom that the lights are visible as far as is called for by the law,—five miles for the mast-head, two miles for the others. This may arise from the use of an inferior illuminating material, from want of trimming the wicks, or from lack of care in cleaning the glasses. In naval vessels none of these causes are very likely to exist; the best of oil is generally furnished, and in the organization of a man-of-war the specified duty of each one of the crew renders the lack of care unlikely and unpardonable. Not so, however, with our friends in the merchant marine, where men are so scarce on deck, and where it may often happen that a cheaper oil is furnished, and even that perhaps in insufficient quantity. The dimness of a light not only prevents its

being seen so far, but often makes it difficult to distinguish the color, not any too well defined at any time. How often is the reply heard, "Can't make it out, sir," to the question, "What color?" To all this, of course, there is no absolute remedy. We cannot expect everything to work as well under all circumstances at sea as in a testing-room on shore. The law should enforce the use of such illuminating material as is found to give the most brilliant light, if suitable in other respects. Petroleum is suggested.

The electric light has also been tried, and promises fine results. Experiments were made with it on board the yacht "Jerome Napoleon" in March and April, 1867. Not only could it be seen very much farther than any other of the lights, but it could be used to illuminate a channel-way, the buoys and beacons being readily distinguished at over half a mile. A magneto-electric apparatus was also placed on board the steamer "Saint-Laurent," of the Compagnie Générale Transatlantique, for trial, in 1868. It was found that by its light the numbers on the buoys in Brest roadstead could easily be read at twelve hundred metres; the flag of an English ship was made out at the distance of a mile; also in getting under way one dark, rainy night, by the aid of this light the men handled the hawsers as in broad daylight. In short, the captain, M. de Bocandé, found it highly satisfactory, and pronounced it a great element of safety against collisions.

In 1875, Captain Trèves, of the French navy, sent a most interesting report to the Académie des Sciences on a system of signals to prevent collisions at sea. Assuming that those accidents generally result from uncertainty as to which way the other vessel will put the helm, Captain Trèves considered it most important to devise some means of imparting that information. The simplest way, he said, would be to use a current of electricity to ignite instantaneously a red or a green Coston light, which would indicate that the helm would be put to starboard or to port,—*i.e.*, that the course would be changed to port or to starboard. While recommending that for the present, however, he proposed for the future a constant vertical beam of light which could be seen from a long distance; this beam deflected downward 40° to the right or to the left would indicate to which side the course would be changed.

All reports and opinions, however, are not favorable to the electric light. The ironclad "Héroïne" was furnished an apparatus in 1869 with which to experiment on the other vessels of the squadron. The captains of the fleet were unanimous in declaring that the light was too dazzling, and that objects not in the beam could not be seen at all.

The shadows thrown in the electric light are the densest known, which is a great drawback to its use otherwise than as a mere beacon. The other disadvantages in its use are: the great expense, the apparatus costing three or four thousand dollars, and the material used about a

franc a night; the space occupied by the apparatus, and by the necessary store of coal, oil, and water; the necessity of having special men to look after so delicate a machine.

In spite of these objections the steamer "Amérique," of the Compagnie Générale Transatlantique, was furnished with one in 1876, the light being exhibited at forty feet above the sea through a lens situated in a tower twenty-two feet high, standing on the forecastle. It attracted a great deal of attention in Plymouth and New York. By an ingenious device placed within reach of the officer on watch, the light could be made intermittent or continuous at will. Captain Pouzolz found that if exhibited in short flashes at long intervals it caused but little annoyance to the officers on watch.

Daltonism, or color-blindness, being a not infrequent physical defect, is cited as an argument against the use of colored position-lights, as any man of the crew is liable to lookout duty at night. A French doctor, M. Favre, examined 1050 men, aged from 18 to 30, and found 98 more or less affected by this peculiarity of vision. In England, at a meeting of the Royal United Service Institution in 1875, Mr. Stirling Lacon announced that experiments carried on in Edinburgh by Mr. George Wilson showed that about 1 person in 17 had defective sight, and that 1 in 55 could not distinguish green from red. These two complementary colors, which are the most often confounded, are the very ones used in Coston signals, in the sectors thrown from light-houses, and in the side-lights of vessels. M. Féris, a surgeon in the French navy, examined 501 men of between 17 and 50 years of age, principally seafaring people, and found 13 almost perfectly color-blind, and 11 others that could distinguish tolerably well the simple colors, but made the most peculiar mistakes in their combinations, mistaking rose for violet and yellow, yellowish orange for red, etc. There were also 23 others from among the 501 that hesitated constantly in defining the various colors. A total, therefore, of 47 men, or 9.4 per cent. of all he examined, were thus affected to a greater or less degree.

Persons troubled in this way, however, are not fitted for active sea duties, and have no business on board ship. Here again, though, we see the disadvantage under which merchant captains labor; their crews are not subjected to such physical examinations as are the recruits for the naval service, and it may well happen that one of their lookouts cannot distinguish between red and green. It must be remembered that very much the greater number of vessels met with at sea belong to and are equipped by private parties, and rules and regulations should be framed with due regard to their frequent inferiority in *matériel* and *personnel*.

Unfortunately, too, this peculiar defect, although most often originating in birth, may be brought about by various causes, such as bruises on the head, typhoid fever, or similar diseases, excessive use of tobacco

and alcohol, to all of which seamen are particularly liable (especially the first and the last). M. Favre, among numerous examples, cites the case of an engineer, to whom, in consequence of a bruise on the eye, red appeared yellowish-gray; yellow, orange; green, black; blue, gray; violet, grayish. Another railway employee, after a similar accident, mistook a twenty-franc gold piece for a silver franc, and a silver piece for a copper sou. He suggests that examinations for this defect should be made whenever practicable after the infliction of a bruise on the head or after a serious illness, and frequently on those that indulge freely in tobacco or liquor.

The extraordinary number of marine disasters of all descriptions that occur in the vicinity of the shores of England is accounted for in a great measure by the frequent and dense fogs there. It seems indeed as though collisions at least could be more often averted if some sensible international code of sound-signals were adopted by commercial nations. The present system is sadly deficient. The proximity of a sailing-vessel is indicated by the blast of the horn, that of a steamer by the sound of the whistle. An attentive ear may even at times detect the general direction of the sound, but not with any certainty. A bank of fog more dense than the rest will deflect sound and make a sort of echo. Even granting, though, that the direction is known, there is nothing to indicate in what direction the other vessel is steering, nor how far off she may be. Steam-whistles have very different power, and can be heard at very different distances; the ever-varying atmospheric conditions also increase the uncertainty.

In the impossibility of one vessel indicating to another her position, it is of great importance at least for each to know how the other is standing. This information could be imparted by some such combination as the following:

One blast to mean the vessel is running before the wind.

Two blasts to mean the vessel is on starboard tack.

Three blasts to mean the vessel is on port tack.

A similar code should be adopted for a steamer's whistle.

One of the most recent and striking examples of a collision resulting from the lack of power to communicate in thick weather is that of the "Vanguard" and "Iron Duke." The squadron were in line ahead, and owing to the fog the signal to reduce speed was not made out. At 12.35 the "Vanguard" was three cables ahead of the "Iron Duke." At 12.43, the fog being so dense that one end of the ship could not be seen from the other, a long, full blast of the whistle was blown by the leader to warn the "Iron Duke"; no answer being heard, it was presumed that the latter had slowed down and dropped far astern. But at 12.50, while the "Vanguard" was manœuvring to avoid a sailing-vessel, the "Iron Duke" came up, saw her too late to avoid her, and struck her nearly amidships, although the engines were backed and the

helm put to port. Unfortunately, in this case neither vessel heard the other's whistle, and the most perfect code would have been useless.

Granting that the best system of lights and the best code of fog-signals be adopted, one thing more is necessary. To crown the edifice and to insure all the provisions of the law being carried out, a penal sanction is essential; that is to say, a penalty in case of violation. The law is constantly violated, and the guilty go unpunished. Vessels of all nations are found cruising in the various oceans with no lights at night, simply because there is no adequate penalty to be inflicted. True, if a collision occur, the vessel proven to be without the proper lights is held responsible. But such possibilities do not secure obedience to the law. A society of ship-masters in Marseilles report that in the Mediterranean only about twenty vessels in a hundred carry position-lights; when they see a steamer coming they show a red, green, or white light until she has passed. "The French carry but few," says this report, "the English, Americans, and other northern nations carry still less, and the Italians, Greeks, and Levantines none at all."

One of the most terrible disasters brought about in this way occurred at the beginning of the Crimean war. One stormy night, while the French fleet under Vice-Admiral Susse were skirting the Tunisian coast, the flag-ship, the "Montebello," going eleven knots, ran right over a merchant vessel that had no lights out. Neither the name nor even the nationality of that unfortunate ship were ever found out.

A more recent instance occurred in June, 1875. The steamer "Ava," of the Messageries Maritimes, sank a ship under sail in the Strait of Messina. The latter had no position-lights out, only showing one at the last moment when it was too late. She was cut in two and sank instantly, and, although the "Ava" stopped and lowered her boats and cruised about there until morning, not a soul was saved, nor a trace of anything found that could indicate her name or nationality.

More dreadful still is it when the vessel without lights sinks the other. What a temptation then for the one in fault to shield himself from blame and pecuniary loss by keeping on without stopping to save life. On the 7th of May, 1869, at half-past two in the morning, the "Edward Hwidt," a Norwegian, ran down the "General Abbatucci," and continued on her course without trying to ascertain the amount of damage done. The "General Abbatucci" sank, and the "Ambla" coming by saved fifty-four of the one hundred and three persons on board.

A vast number of similar instances might be cited. The only means to stop such culpable recklessness is in the infliction of a severe penalty. Different nations have different laws in regard to it, some more rigid than others; but the only efficacious mode of procedure is an international one. Men-of-war of all countries should have the right of boarding any vessel they meet that has no lights out, and

make a statement of the facts on the muster-roll of the crew. The competent authority could then punish the guilty captain on his arrival in port. The muster-roll is proposed, as it cannot be replaced nor counterfeited, and always has to be turned over to the port-officers. The log-book would require a lengthy examination, and could well be made so voluminous as to facilitate the passage being overlooked. Moreover, the law of most countries does not really compel a captain to submit his log-book for examination, but only for the *visa*.

A law conceived in the following terms would induce ship-masters to think twice before determining not to show their lights:

ART. 1. Every captain who shall not have the regulation lights burning through the night shall be prosecuted, and shall be liable to imprisonment for six to twelve months, and to a fine of two hundred to six hundred dollars. In case a death results from collision under those conditions, he will in addition be suspended for five years.

ART. 2. The officers shall be held equally responsible during their watch, unless the captain shall have positively ordered them not to light the lights.

It frequently happens that the captain is not solely responsible, but that the charterer does not furnish the necessary supply of oil. An examination by the custom-house or other officers could determine whether the requisite amount had been supplied, and the vessel should be detained in port until properly equipped. There should be no difficulty about that though, for the captain, being responsible in the eyes of the law, would make all such arrangements with the owners. Certainly the latter could not be held responsible for the neglect of the captain.

The idea of having a light to show abaft the beams and astern seems a very happy one. In the daytime one vessel frequently passes another, and every one sees it and speaks of it, but never thinks of it in the light of a possible danger; the same thing occurring at night is seen only by the officer on watch, who perhaps soon forgets it. The consequence is that the necessity of a stern-light is not generally appreciated, and there may be a tendency to argue against the precaution. Railway trains always have a light hanging from the rear car; it really seems equally important that ships should be similarly provided. Whether to do this in the way suggested by M. Caffarena, or by having one additional white light at the stern, is a practical question of handiness and economy.

The main difficulty seems to lie in the possibility of confounding the one stern-light seen with a steamer's mast-head light; but even that would be obviated by the proposed additional red light. The desirability of this is perhaps a question. The chief objection is that it will necessarily be very close to the white one, and the two will not be seen separate until the vessels are very close; its sphere of usefulness will,

therefore, be greatly limited. In entering harbors and fairways, if steamers were compelled to go at reduced speed, the side-lights of any other vessels would probably be seen in time to avert calamity.

On the other hand it offers two great advantages. As originally claimed it distinguishes the bow from the stern. It would also serve to distinguish a mast-head light from that of a light-house on shore. The writer must confess to having made that mistake more than once. In one instance, not long ago, while congratulating himself on having made an exceptionally good landfall, the extreme rapidity with which the light began to draw aft elicited an attention sufficiently close to detect a faint green light underneath. The same mistake, however, far from being a joke, might prove fatal, as it very nearly did in July, 1879, to the steamer "Baltic." The account of it given in the New York *Herald* states that a light that was sighted while nearing Holyhead was mistaken for a vessel's light, and the helm was put to port. The mistake was only discovered in time to lessen the blow by backing the engines and using the helm to strike "end-on."

If the additional red light should be adopted, it seems hardly advisable to limit its range to four points on each bow as proposed. By so limiting it its very *raison d'être* would be partially nullified, for then through four points forward of each beam there would exist the very doubt which it was intended to remove. It would be preferable to allow the full range of 180° if any.

The progress that has been made during the past few years in the manipulation of electricity, so to speak, argues well for the future of the electric light. It is generally claimed that its great expense will prevent its ever being substituted for the means of illumination now in common use. But we must also remember that when steam was in its infancy it was predicted that no vessel could be built large enough to carry the coal necessary for its own propulsion across the Atlantic. It is hard to foretell the future of modern inventions.

The apparatus mentioned by M. Caffarena is still maintained on board the "Amérique," and a similar one has been furnished the "France," of the same company. The old oil lamp is used in ordinary weather, but in fogs the electric light is shown to magnificent effect. Many ironclads of the modern fleets of Europe are now similarly equipped, and every day its use is becoming more general, both afloat and ashore.

The "Peter the Great" and the "Admiral Popoff," of the Russian navy, are fitted with electric side-lights. A constructor in that service, Mr. E. E. Goulaeff, told the writer that he had seen the red light of the former vessel at a distance of ten miles, and that it undoubtedly was visible much farther. The same vessel has in all eight electric lamps; three are used in the engine-room, three for the running lights, and two for work on deck. The current for all is generated by one

Gramme machine, which cost about three hundred dollars. It is placed in the engine-room, and requires an addition of two special men to the complement of the ship.

The objection to the proposed method of indicating the position of the helm by the deflection to starboard or to port of a vertical luminous beam would seem to be, that while it would serve the purpose admirably in the case of two vessels meeting "end-on," the greater or less perspective in other cases might cause uncertainty.

The pistol-signals devised by Lieutenant E. W. Very, U. S. Navy, must answer the purpose far better. From a breech-loading pistol, of simple but special character, stars or fire-balls, of a selected color, are discharged to a height or distance in any direction of from three hundred to four hundred feet. The exhibition of a green one indicates that the course is to be changed to starboard; a red one, to port. These stars, which are contained in an ordinary cartridge for breech-loaders, and which can be discharged at the rate of ten per minute if required, are so brilliant as to be seen from a distance of twenty miles on a clear night. Rear-Admiral J. R. Ward, R.N., alluding to the system, says, " . . . it is so different from all others hitherto in use, and is at the same time so simple, so easy of display, and so inexpensive, that it would be admirably adapted for the purpose."

Admiral Ward states in the columns of the London *Times*, that he had seen the stars distinctly from a distance of seventeen and a half miles, at an official trial under the direction of Major Le Mesurier, inspector of army signaling at Aldershot. After enumerating the many advantages of the signal-light, he goes on to say that the national life-boat institution is about to adopt them at its stations in lieu of rockets, and also on board its life-boats,—of which he is the chief inspector. Major Le Mesurier has also strongly recommended that they should supersede rockets for army signaling, and a large number have been already ordered by the British War Department for that purpose.

In October, 1878, Mr. S. J. Mackie patented, in England, a sound and light-signal, likewise designed for ships' use in cases of imminent collision. He gives the following description of his invention in the London *Times:* "The signal is fitted like a hood on a metal pin. One of these pins is attached to each bow of the vessel. On discharging, a loud report is followed instantly by a red or green light, which burns for a sufficient length of time to effectually continue the lookout warning given by the report. The discharge of the signal is by electricity, and is automatically dependent on the side to which the helm itself is put over, the captain making electrical contact by a blow of his hand when giving the order to the steersman, so that there can be no mistake in the warning given to the approaching ship. The advantage of my system is that it is always ready, and that the discharge signal can be immediately replaced."

The only weak point in this system seems to be that the signal burning on one side could be hidden by sails, gear, or the keel, if a sailing-vessel on a wind, to any vessel approaching on the other side. Collisions rarely occur between vessels approaching "end-on."

With regard to the propriety of fixing by law the exact position for the side-lights, a case in point comes to mind illustrative of the advantage in having them well aft. Some three years ago, H. M. S. "Minotaur" was struck on the starboard quarter by a small sailing-vessel. The "Minotaur's" lights were well forward, and the master of the brig, when examined, said he had luffed until he saw all three masts pass, and then had filled away again. He did not make allowance for its being a five-master that he was trying to avoid! Had the iron-clad's lights been farther aft the collision might have been avoided.

It would be an easy matter to provide vessels with a small outrigger, or bumkin, to be placed near the stern, and to extend out far enough to let the light show directly ahead. For convenience in handling, and for security in approaching docks or other vessels, they should be made to rig in and out.

The lamentable and evidently not infrequent physical defect of color-blindness has commanded increased attention of late years. The New York *Times* and the Boston *Advertiser* have recently published several articles on the experiments of Dr. B. Joy Jeffries, of Boston, to detect its existence among the employees of railroad and steamboat companies. "Out of 94 employees constantly called upon to distinguish lights by their color, 2 are color-blind, and 18 are below the visual standard."

It is a matter of even greater importance at sea than in the management of trains on shore, for this reason. The lights at switches, stations, etc., cannot only be made of different colors, but of entirely different shapes and sizes, so as to constitute intelligible signals to any one that can see them. It would not help much to have such distinctions made at sea.

And yet it would seem a pity to discard the colored position-lights with all these great advantages. Two pairs of eyes will generally be able to get at the color of a light, and there should always be at least that number on deck at a time. There has been a system of white range-lights proposed, however, that deserves serious attention. Perhaps the originators or advocates will publish a full explanation of it some time.

In the matter of fog-signals, an indication of compass-points by combinations of sounds promises better results than anything depending upon the state of the wind. The following code, already introduced into the United States naval service, has been submitted to the foreign governments with the proposal to adopt it as an international code. The law congress now in session in London will probably settle

the matter, as it has been added to the programme by the American Executive Committee:

Course.	Between what Points.	Sounds.
NORTH . .	N. by W. and N. by E. . . .	O
N. N. E. . .	N. by E. and N. E. by N. . . .	O — O * O
N. E. . . .	N. E. by N. and N. E. by E. . .	O — O * O * O
E. N. E. . .	N. E. by E. and E. by N. . . .	O — O * O * O * O
EAST . . .	E. by N. and E. by S.	O * O
E. S. E. . . .	E. by S. and S. E. by E. . . .	O * O — O
S. E.	S. E. by E. and S. E. by S. . .	O * O — O * O * O
S. S. E. . . .	S. E. by S. and S. by E. . . .	O * O — O * O * O * O
SOUTH . .	S. by E. and S. by W.	O * O * O
S. S. W. . .	S. by W. and S. W. by S. . . .	O * O * O — O
S. W.	S. W. by S. and S. W. by W. . .	O * O * O — O * O
W. S. W. . .	S. W. by W. and W. by S. . .	O * O * O — O * O * O * O
WEST . . .	W. by S. and W. by N. . . .	O * O * O * O
W. N. W. . .	W. by N. and N. W. by W. . .	O * O * O * O — O
N. W. . . .	N. W. by W. and N. W. by N. .	O * O * O * O — O * O
N. N. W. . .	N. W. by N. by W.	O * O * O * O — O * O * O
	Hove to, or lying still	O — O * O * O — O
	Towing, or being towed	O * O — O * O * O — O * O

"O indicates a sound or blast of horn or whistle.

"* indicates an interval of one-half second between sounds or blasts.

"— indicates an interval of not less than four seconds between sounds or blasts.

"These compass-signals are not to be repeated oftener than at intervals of not more than one (1) minute when made by steam-whistle, and at intervals of not more than five (5) minutes when made by fog-horn.—[Revised Statutes, Section 4233, Rule 15, Rules for preventing Collisions.]

"When by these signals or other indications the presence of another vessel is made known, each vessel must be brought up to the exact point, as per first column, 'Course,' and not steer between the points, as per second column, until they have passed each other, due regard being paid to the dangers of navigation.

"When the vessels sight each other the Rules of the Road must be followed."

Before seeing this code, which was adopted in January, 1879, the writer had devised the following: Courses between north and east, to be indicated by two long blasts; between east and south, by three; between south and west, by four; between west and north, by five long blasts. A single blast was purposely avoided, so that vessels could give that just as an indication of their presence, without fearing that other vessels possibly near would take it to mean that they were steering north, or on any other particular course that one blast might indicate. To complete the code, the N. E., S. E., S. W., and N. W. points being indicated by two, three, four, and five long blasts, one short blast preceding or following them would indicate two points before or after them in the order in which the compass is usually boxed,—that is,

"with the sun." A long blast was intended to be about six seconds in duration; a short one, one second. The code complete is as follows, L indicating a long blast, and s a short one:

Course.	Signal.
NORTH	s — s — L — L
N. N. E.	s — L — L
N. E.	L — L
E. N. E.	L — L — s
EAST	L — L — s — s
E. S. E.	s — L — L — L
S. E.	L — L — L
S. S. E.	L — L — L — s
SOUTH	L — L — L — s — s
S. S. W.	s — L — L — L — L
S. W.	L — L — L — L
W. S. W.	L — L — L — L — s
WEST	L — L — L — L — s — s
W. N. W.	s — L — L — L — L — L
N. W.	L — L — L — L — L
N. N. W.	L — L — L — L — L — s
Hove to	s — s — s —— s — s — s

The advantages claimed for this code were that each quadrant had its distinctive number of long blasts, easily remembered and also easily heard and counted. The short blasts, never exceeding two in number, are of only secondary importance, and even if they were missed altogether, the quadrant would be known and the course to within four points.

The following description of a contrivance by Mr. William B. Barker for signaling by blasts of steam or air is taken from the New York *Herald* of August 17, 1879: "It is a large disk, having on it the several points of the compass. In the centre of this disk is a pin on which an arrow works. The signals are given by aid of a lever, that works horizontally in the following manner: on the under side of the disk are little blocks, having spaces between them equal to the length of the sound required. A spring works a little bar that travels over these blocks and spaces so that the steam or air is cut off from the fog-whistle at regular intervals. Every four points of the compass have a different signal, so that the whistle tells the approaching craft on which course the vessel is sailing. Thus, between north and northeast the whistle would blow once for six seconds and twice for two seconds each, the interval between each sound being about three seconds. The instrument could be used by every nation, as there is nothing but the sound and the points of the compass to go by. The lever is so con-

trolled by compressed air that it is not possible to slip over the sounds; they have to come at the regular velocity. The machine takes up very little room (less than that of a binnacle)."

A modification of this device could be made applicable to any code.

Finally, as M. Caffarena very justly says, a penal sanction to laws now existing or to be enacted is of the utmost importance to secure their efficient working. In these days when vessels go to sea undermanned and loaded down to the water's edge, when almost everything is sacrificed to a greed for gain, the only way to enforce the laws and give some protection to life and property on the seas is to hold a severe penalty over the heads of those that transgress. The extent of the penalty is hardly within the limits of this article, nor, perhaps, is even a discussion of the best way to bring the offenders to punishment. It is so greatly in the interest of all, however, to secure this, that the proposed plan of the right of visit by naval vessels seems to demand attention.

The principal duty of men-of-war in time of peace is to police the seas; hydrography and exploration are but second to that. What can be more needful of strict surveillance than the measures taken to render life and property more safe? The one great drawback, however, to this right of visit is that it might at times be tortured into a right of search. Not all nations, but perhaps some, perhaps one, would be regarded with the utmost distrust in the event of this measure being proposed in a law conference. In all probability the United States would be the very first to flatly refuse signing any such treaty, and no one would express much surprise, especially if familiar with the early traditions of our country.

SEATON SCHROEDER,
Lieutenant U.S.N.

MILITARY LANDMARKS.

THE history of our military posts must be of interest not only to the army which is specially concerned, but to all the people of this country. This subject, however, has been wholly neglected till within a recent period, when the matter was brought to the attention of the Secretary of War, who, in his report of 1875, refers to it as follows:

"With the exception of the few official items contained in the archives of the War Department, the only information concerning the early history of our military posts is gained from vague traditions and personal reminiscences. No record showing when, why, or by whom a military post was established, or who have been its commanders, or the origin of its name, in many instances, can be found by any officer assigned to its command. This serious omission can be corrected by requiring the commander of every post to keep a historical record book, and to enter therein every important event occurring within the scope of his command,—this book to be transferred by each commander to his successor, and not to be removed from the post, unless it is abandoned, in which event it should be forwarded to the adjutant-general for file in the War Department. Such a book would be of great value for subsequent reference, as it would contain a catalogue of all errors committed, thus preventing their recurrence; also affording reliable information regarding special service of troops and their results. As a faithful delineation of the stirring events of the early days of these frontier posts must in the future possess great historic import, so to the experienced officer its military signification and value as a record would be invaluable, and it would not be devoid of interest to those civilians who appreciate the importance of the rapid settlement and development of the resources of the West."

The duties of our standing army are numerous and arduous. It is dispersed in small detachments to garrison military posts scattered at wide intervals throughout extensive districts of unsettled territory, for the purpose of protecting the frontiers from depredating bands of Indians. Besides this, it has to assist the Department of the Interior to maintain its authority in the various reservations; to explore and survey unknown Territories; to aid the civil authorities in enforcing the laws and maintaining peace in remote districts; to escort national

boundary, State, and Territorial surveying parties; to protect and defend the advanced lines of railway in the far West; and, finally, to do everything in its power to forward the advance line of civilization.

But notwithstanding the multifarious duties of our little army, Congress at almost every session brings forward bills for its reduction. These frequent cuttings and hackings of the army, which is far from being adequate to the efficient performance of its varied duties, tend materially to weaken its morale. It is to be hoped for the future that our truly wise men in Congress, who have the welfare of the country at heart, will perceive no necessity for a further application of the pruning-knife to the army. It should be borne in mind when a bill of this character comes up for consideration, that our settlers are spread over a greater extent of, and more dangerous frontier, than at any previous period. The massacre of the good and hardy settlers of Minnesota does not date so far back as to be forgotten. That appalling and bloody catastrophe should in itself be a lesson and a warning for all time.

Our frontiers to-day are no better guarded than they were in those days, when the great extent of territory to be protected—millions of square miles—is taken into consideration. In our effort to protect this great extent of country we weaken our forces and render them all but worthless to compete with their wily foe, the Indian. This fact is fully illustrated in the recent wars with the Sioux, and the great slaughter of Custer's command. To reinforce Terry and Crook troops had to be ordered from Texas and the Pacific coast.

Whatever retards the settlement and growth of our border States in the West must be deplored by all who have a proper appreciation of the welfare of our country, because in the States already organized there, and those yet to be organized, lie the germs of incalculable national wealth. Read the reports of our great scientists and explorers, and in them all will perceive the paramount necessity of our little army, and the great good it is doing and can do as the guardian of the great West and the national welfare. Anybody who has had any experience on the borders well knows that it is the presence or proximity of the blue-coats that makes the country practicable for settlement.

The stand-points, or forts of the army, are everywhere to be found, as well in the heart of what is now civilization as on and beyond the extreme frontiers of the Western States and Territories, where it has manfully striven, and generally successfully, to keep Indians beyond the sacred circle of our frontier settlers. But these old landmarks are gradually being blotted from existence. The most recent demolition is old Fort Kearney, a twin sister of Fort Laramie, being both built within a year of each other as sentinels on the overland route to Salt Lake and California. This familiar landmark of only a few years ago, and which used to be as it were an oasis in a desert of prairie to

the Forty-Niners and other adventurous spirits occidentally inclined, was a few years ago fully broken up, and its buildings, except those that had decayed from age, moved to military locations farther west.

A local paper, the mouth-piece of the civilization of which Kearney is now the centre, commenting on the fate of this old post, remarks, "One after another the old landmarks of 'The Plains' are going the way of all earthly things. Dogtown and Dobytown, once eagerly-sought havens, now exist only in name, and even these are known only by half our people. Dead Man's Ranch, at the outlet of the large lagoon near Kenesaw, once a miniature city, the dividing and uniting points of Wells, Fargo & Co.'s trains for different points, with its seventy-five or one hundred travelers, freightmen, and other employees finding nightly accommodations, is almost entirely obliterated, so much so that very few of the adjacent settlers (farmers) have any knowledge of its ever having existed. Two partially filled wells, with a few crumbling sod walls, are about the only local traces which now remain of this once bustling place. And now the most noted and best known of these landmarks is going: old Fort Kearney is dismantled.

"Kearney was long the central and important point for all operations, military or civil, with whites and Indians for all the plateau country between the Mississippi River and the Rocky Mountains. It was the heart of a life strongly marked and altogether unique, finding, probably, no parallel in history. Through it there pulsed the currents of some two or three pretty clearly marked and successive varieties of this peculiar life (Plains-life), with a language corresponding to each individual form." "The Plains-life should be rescued from the oblivion into which it is rapidly passing. Nothing like it was ever seen in any land, nothing like it will ever be seen again. It was filled with thrilling events, and was rich with wild scenes and tragic incidents; the pen that should succeed in painting it in its real colors would put Bret Harte's pictures of California far in the shade."

Fort Kearney was first established under the name of Fort Childs, in the year 1848, at which time it was the only intermediate station between Fort Leavenworth, Kansas, about three hundred and fifty miles east, and Fort Laramie, about four hundred miles west. It was established, as Fort Laramie was the following year, for the protection of the West-bound emigrants and peaceable Indians from hostile Indian tribes and outlaws infesting the country. It was located on the right bank of the Platte River, at a point about five miles southeast of the present Kearney Junction, on the line of the Union Pacific Railroad.

It may not be uninteresting to remark here that the road to the east of Kearney, which was once the great overland route, has almost wholly disappeared, having been cut up into farms. In a very recent survey to decide a claim against the government for transportation that took place as far back as '54 or '55, it was with the greatest difficulty that

the road could be traced. Frequently it was found to extend through the centre of immense corn-fields, and the farmers would turn out of their houses astonished and bewildered to see men with chain and theodolite coursing through their well-stocked farms. The officer who conducted the government part of the survey said he expected to see them appear with their shot-guns to demand the purpose of their intrusion. But luckily after an all summer's trip they reached Fort Laramie without accident, with the exception of a few ridiculous Indian scares.

The old overland route, however, to the west of Kearney is less thickly settled, the settlements not extending over one hundred and fifty miles, west of which it is almost in its pristine wilderness. The two famous landmarks, Court-House Rock and Chimney Rock, are located on this stretch. The former was the first point coming from the East, and it will stand as a monument for many years to those who, in the days of overland travel, carved their names and initials on its soft sandstone faces. The latter was passed seventeen miles farther west. This rock is very deceptive in its appearance, because from its peculiar position away to the left a person is led to suppose he is a mile or so from it, when in reality he is five miles or more. When seen on a clear morning it seems but a short distance off, but before arriving opposite to it the ordinary day's march is almost completed. The rock derives its name from a shaft of singular formation, and is said to be over three hundred feet in height. It is so weather-worn that it seems as if the first summer's storm or winter's blast must topple it from its base and destroy it utterly. All those who have traveled over this now disused route must have a vivid recollection of these two landmarks. A little farther westward are Scott's Bluffs, being a very high, abrupt, wooded ridge, butting near the right of the road over which the famous Concord used to pass filled with passengers. Jim Bridger, without mention of whose name no story or description of the Northwest would be complete, being asked upon one occasion how long he had been in the country, replied that "he had been in it since the time Scott's Bluffs were a hole in the ground."

The only other point worthy of mention before reaching Laramie is the site of the Grattan massacre, whose monument is a rude pile of stones, which is about nine miles from Fort Laramie.

This massacre took place on the 19th day of August, 1854, and the cause that led to it was a very simple one. It seems that the Indians, a day or two prior to the date mentioned, had killed a broken-down cow or ox belonging to a Mormon train *en route* to Salt Lake. This outrage was brought to the notice of Second Lieutenant Fleming, commanding the post, who, believing that the Indians should be called to account, ordered Brevet Second Lieutenant John L. Grattan, Sixth Infantry, and thirty men of his company to proceed to

the Indian village, demand the value of the animal killed, and bring the thieves to the fort. Having arrived at the point indicated by the mound of stones, Grattan and his command met the Indians (Sioux), under their chief, Mattoc-o-way. A parley ensued. Grattan made his demands in very positive terms. The Indians tried to propitiate him by imputing the killing of the animal to a mistake, and offering to pay considerably more than the animal was worth, but they declined positively to give up the culprits. Grattan would not recede from his demand for the thieves, and set about marshaling his command for a fight. The guns or howitzers were loaded and pointed. The chief of the Indians placed himself in front of them and entreated that they should not be fired on his people. But reason had fled; the guns were fired, and the good chief lay a mangled mass on the ground. The Indians wanted no further parley; a fight ensued, and in a few minutes Grattan and his men, with the exception of one man, were utterly annihilated. The survivor was hidden in the bushes by a friendly Indian, and brought the same night to the post, where he lingered for two days, and died of his wounds. There were two citizens with Grattan's command, a guide and interpreter hired at the post.

At the time of this appalling affair, for such it was, there were but seven men at the post. The other men of the company ("G," of the Sixth Infantry) were up the river in the hay-fields. But as soon as the wounded soldier and Indian arrived and imparted the terrible news everything became a state of consternation; the women shrieked and the men were all but panic-stricken. Couriers were dispatched from the post by Lieutenant Fleming, with imperative orders for the hay party and every absent man to return to the fort without delay. They arrived none too soon, for a few minutes thereafter the Indians appeared in large numbers at prominent points on the bluffs eastward of the post, richly and grimly bedecked in war-paint and feathers. The people within the fort gave themselves up for lost, but were determined to a man to sell their lives dearly, and never surrender to the barbarous foes that show no quarter and know no mercy.

With this determined end in view, cannon, ammunition, men, women, and children were all gathered in one little adobe building, which is still standing at the fort, where they were to hold out to the death. Part of their plan was to fire the remaining buildings at the fort. But happily for this forlorn party, the Indians left without attacking or doing further harm.

Grattan at the time he made the demand upon the Indians had two twelve-pounder howitzers, and in preparing the pieces for action gave the formal commands for firing in a tone loud enough to be heard by the Indians, and it is said before the final command the Indians dropped to the ground, and the shots passed over them without harm, except to the good chief, who fell, horribly mangled, near the pieces. He was the

only Indian killed in the whole affair. Grattan must have been wild, mad, or something else, because at the time of his fatal commands the valley of the Platte, near the scene of the conflict, was covered with tepees or lodges, the number of Indians (Ogalalla and Brulé) being estimated at two thousand.

This unprovoked and disastrous attack upon the Indians was the prime cause of the Indian war that immediately followed, and which was terminated by the Ash Hollow battle, in which a large number of Indians perished. General Harney, who commanded the troops in this engagement, was ever after feared by the Indians.

Fort Laramie, since the demolition of Fort Kearney, which we have seen preceded it in existence one year, is now the oldest, and in many respects the most famous, of our Western forts, and even to this day is an important objective-point in the Indian country.

It is pleasantly located on the left bank of the river from which it receives its name, and is at an altitude of four thousand five hundred and nineteen feet above the sea-level, and a little over a mile distant from the Platte River.

We have no doubt that Major Sanderson, of the Rifles, when he arrived here, in July, 1849, selected the plateau on which the post is built on account of the beautiful view it affords of the river valley, both above and below the post, and of the healthfulness of the elevated situation, as well also as of its eligibility in other important particulars, such as abundance of building material and fuel.

The Laramie River, which gracefully winds around two sides of the post, is a rapid and beautiful stream, with water so clear that its gravelly bed is plainly perceptible through a depth of several feet. Its water is considered very wholesome, and is supplied to the different quarters by means of a rectangular box on wheels. It is evident from the lay of the country that with but little expense to the government the water might be brought directly into the post, which would result in a great saving of men, money, and material.

The Laramie, which flows in a northeasterly course, has its rise in the Laramie Mountains, a detached group of the Black Hills. Its most important tributary is the Chugwater, whose valley possesses some fine scenery and some of the most desirable farming and grazing land in this vicinity. Both streams are sparsely settled with ranches, to which the Indians used to make periodical visits to collect stock, mules, and horses not their own.

The timber on the Laramie, within the limits of the reservation, is extremely scarce. But in its youthful days and before the advent of the volunteers, or the "galvanized," as they were called, it had an abundance of beautiful trees, among which there were a number of pretty glades, just suited for picnics. There are a few remaining, which, for pleasure purposes, are often visited by the inhabitants of the post.

Fort Laramie is situated in Wyoming Territory, its latitude being 42° 12′ 38″ north, and longitude 104° 31′ 26″ west from Greenwich. The climate is superb and perfectly healthy. The air is dry, pure, and bracing, and malaria and its concomitants are unknown. It is free from extremes of heat and cold, the yearly average temperature being 50.6°. The winters are mild, and snow rarely falls to any considerable depth in the valley, but when it does a warm sun or wind takes it off in a few days, so that cattle, for which Wyoming is becoming noted, have abundant grazing the year round. Large herds of fine cattle are pastured within a few miles of the fort, from which, on contract, the post is supplied with beef.

In scanning the history and records of this old post, we find that before the white man made permanent habitation where the fort now stands the whole of this Laramie and North Platte country was the hunting-ground for many tribes of Indians, and in it they waged their internecine wars. Countless herds of buffalo, where there are none now, held the ground in fee-simple: not even a red man had claim to it.

In 1834 two men, named William Sublette and Robert Campbell, coming to this part of the country to trap beaver, found themselves obliged to construct some sort of protection against the roving bands of vagabond Crows and Pawnees which occasionally swept along the Platte Valley, stealing when they could. Sublette and Campbell built in that year, a little below the present site of Fort Laramie, a square fort of pickets, eighteen feet high, with little bastions at two diagonal corners, and a number of small houses inside for their employees. The following year they sold out to Milton Sublette, James Bridger, and other trappers, and, being in partnership with the American Fur Company, continued the beaver-trapping business. Soon after the transfer, and in the same year, the company sent Keplin and Sybille to Bear Butte and Northern Black Hills to persuade the Sioux Indians to come to this section, hunt the abundant game, and live in the vicinity of the fort. This embassy was very successful, for Keplin and his companion soon returned with over a hundred lodges of the Ogalalla and Brulé Sioux, under their chief Bull Bear. This was the first appearance of the powerful Sioux nation, or the Red Cloud and Spotted Tail people, in this part of the country, which they speedily overran, driving away the Cheyennes, Pawnees, Crows, and others from its very borders.

The fort, as a matter of course, speedily became a trading-post, where the Indians bartered a buffalo-robe for a knife, an awl, or a drink of fire-water. Anything the company had to trade was at least of the value of one robe. An American horse brought fifty of them, and any pony was worth twenty or thirty. In those days any old scrap of iron was of great value to the Indians, being converted by them into knives or the modern arrow-head. Fire-arms they had none, and their arrow-heads were all made of pieces of flint or massive quartz, fashioned into

proper shape by the laborious process of picking with another stone. The Sioux had then no horses, but wild horses were abundant at the time of their arrival, and it was not many years before they learned their use. What a grand difference between then and now! and what an effect modern civilization and the white man have had upon the Indians! Now they are fully armed and equipped with the latest improved breech-loading rifles, the white man's invention, and mounted on their ponies they outmanœuvre our cavalry. This is progress, but it is death to the white man and extermination to the Indians.

In 1836 the picket fort became so old and rotten that the company rebuilt it of adobe at an expense of ten thousand dollars, when it was named Fort John, which not being popular, it was afterwards named Fort Laramie. This name was a very proper one, for the reason that the fort was on the bank of the Laramie River, and from it, fifty miles away, Laramie Peak could be plainly seen. The name originated with the company's clerks in their city offices, who had labeled their articles Fort Laramie. It seems that Laramie, for whom the river and peak were named, was a trapper, one of the first French voyageurs, and was reputed to be the first man who ever trapped a beaver or shot a buffalo in the Rocky Mountains. He was killed by Arapahoes at the head-waters of the Laramie, and this circumstance gave the stream its name.

The following from *The Oregon Trail* will give a good idea of the original Fort Laramie as it appeared in 1846:

"Fort Laramie is one of the posts established by the 'American Fur Company,' which wellnigh monopolizes the Indian trade of this region. Here its officials rule with an absolute sway. The army of the United States has little force; the extreme outposts of her troops being seven hundred miles to the eastward of Fort Leavenworth. The little fort is built of bricks dried in the sun (adobe), and, externally, is of an oblong form, with bastions of clay, in the form of ordinary block-houses, at two of the corners. The walls are about fifteen feet high, and surmounted by a slender palisade. The roofs of the apartments within, which are built close against the walls, serve the purpose of a banquette. Within, the fort is divided by partitions; on one side is the square area, surrounded by the store-rooms, offices, and apartments of the inmates; on the other is the *corral*, a narrow place, encompassed by the high clay walls, where at night or in presence of dangerous Indians the horses and mules of the fort are crowded for safe-keeping. The main entrance has two gates, with an arched passage intervening. A little square window, high above the ground, opens laterally from an adjoining chamber into this passage; so that when the inner gate is closed and barred, a person without may still hold communication with those within through this narrow aperture. This obviates the necessity of admitting suspicious Indians, for purposes of

trading, into the body of the fort; for when danger is apprehended the inner gate is shut fast, and all traffic is carried on by means of the window. This precaution, though necessary at some of the company's posts, is seldom resorted to at Fort Laramie; where, though men are frequently killed in the neighborhood, no apprehensions are felt of any general designs of hostility from the Indians.

"Fort Laramie and its inmates seem less like a reality than like some fanciful picture of the olden time; so different is the scene from any which our civilization can present. Tall Indians, enveloped in their white buffalo-robes, were striding across the area or reclining at full length on the low roofs of the buildings which inclosed it. Numerous squaws, gayly bedizened, sat grouped in front of the rooms they occupied; their mongrel offspring, restless, vociferous, rambled in every direction through the fort; and the trappers, traders, and engagés of the establishment were busy at their labor or their amusements."

The American Fur Company retained possession of the fort until 1849, when it was purchased, upon the request of Major Sanderson, by Lieutenant Woodbury, of the engineer department, at a cost of four thousand dollars. Bruce Husband was the last representative of the fur company who had charge of Fort Laramie, and it was he, as the agent of the company, that turned the fort over to the military. It was on the 26th of July of this year that the troops or the military arrived at the fort, as indicated by the following extract:

"Fort Laramie, July 27, 1849.

"Sir,—I have the honor to inform you that Brevet Lieutenant-Colonel Roberts, Rifle Regiment, First Lieutenant W. L. Elliot, with Company C, Rifles, consisting of sixty-two men, arrived at this post on the 26th of July, 1849, and formed part of the garrison of the post.

"I am, sir, very respectfully,

"Your obedient servant,

(Signed) "W. F. Sanderson,

"Major Commanding Post.

"To Major Don Carlos Buell,

"Asst. Adjt.-Genl.,

"St. Louis, Mo."

Company G, Sixth United States Infantry, to which Grattan and his men belonged, arrived in August of the same year, under the command of Captain Ketchum, of poison notoriety.

The officers who have held command at Fort Laramie from its establishment to the present time are as follows:

Major Sanderson, Rifles, 1849; Captain W. Scott Ketchum, Sixth Infantry, 1850–52; Second Lieutenant Levi C. Bootes, Sixth Infantry, 1850–51; First Lieutenant R. B. Garnett, Sixth Infantry, 1852–54; Brevet Second Lieutenant H. B. Fleming, Sixth Infantry, 1854; Major

and Brevet Lieutenant-Colonel William Hofman, Sixth Infantry, 1854–55; Colonel Monroe, Fourth Artillery, 1859; Major James Van Voast, Eighteenth Infantry, 1866; Lieutenant-Colonel I. N. Palmer, Second Cavalry, 1867; Major George H. Howland, Second Cavalry, 1867; Lieutenant-Colonel A. J. Skinner, Fourth Infantry, 1868; Captain Robert McKibbin, Fourth Infantry, 1868; Captain A. B. Cain, Fourth Infantry, 1868; Major William McE. Dye, Fourth Infantry, 1868–69; Colonel F. F. Flint, Fourth Infantry, 1870–71; Colonel John E. Smith, Fourteenth Infantry, 1871–74; Major M. M. Blunt, Fourteenth Infantry, 1871–74; Major E. W. Crittenden, Fifth Cavalry, 1871; Captain Guido Ilges, Fourteenth Infantry, 1872; Lieutenant-Colonel C. Grover, Third Cavalry, 1872; Captain A. W. Bainbridge, Fourteenth Infantry, 1872; Colonel John H. King, Ninth Infantry, 1874; Captain John Laub de Laubenfels, Fourth Infantry, 1874; Major E. M. Baker, Second Cavalry, 1874; Lieutenant-Colonel L. P. Bradley, Ninth Infantry, 1874–76; Major E. F. Townsend, Ninth Infantry, 1876; Captain T. B. Burrowes, Ninth Infantry, 1876; Captain Edwin Pollock, Ninth Infantry, 1876.

At the date of this writing the names of officers commanding about the period of the breaks could not be ascertained.

The modern Fort Laramie is built in the form of a rectangle; the men's barracks, six in number, in long buildings occupying the north and east sides, post headquarters and officers' quarters the south side, and officers' quarters the west side. On the last-mentioned side is old "Bedlam," which was sent out in finished parts with the first troops from Fort Leavenworth, a distance of between six hundred and seven hundred miles. The episodes connected with this old building, were they well known and properly told, would form a volume in themselves. We have ourselves seen every room from lower to upper story brilliantly lighted and filled with card-parties, composed of officers, some of whom have since become distinguished. This old building is still used as officers' quarters, but it is hardly habitable, owing to its dilapidated condition, its warped boards affording shelter for bats and swallows. An officer's wife, writing to her friends or relatives in the East, who were concerned about her being so far away on the frontier, informed them that she was in no danger, and was dwelling in a forty-thousand-dollar house, meaning "Bedlam," that being the original cost of the house.

The magazine is also located on this side, and although standing by itself in early days, it is now wedged between officers' quarters. Some people might be nervous being so near to tons of powder and ammunition, but the people here treat it with the greatest indifference.

The quartermaster's store-houses, workshops, corral, stables, commissary store-houses, hospital, and a long, low building, "River-Side," or "Venice," which is used as officers' quarters, are all on the north side of

the post. There are two new buildings on this side of the post, which are built of concrete, a conglomeration of gravel and lime and water. One is a hospital two stories high, with wings extending north and southeast. The other, a long building designed for two companies of cavalry, is two stories. The upper story is divided into sleeping apartments; the lower, into kitchens, dining-rooms, reading-rooms, orderly and other rooms. Both of these buildings are superior edifices, and reflect credit upon the government. They are a step in the right direction, it being full time for mud roofs and dingy quarters for troops in garrison to pass from existence. These buildings, however, like most army quarters, are minus the grand essential of bath-rooms and bathing facilities for the men.

We strolled to the grave-yard on the hill, and there saw the elevated grave of Spotted Tail's daughter, which was very much worn and faded. At the time this Indian princess died she was about two hundred miles from Fort Laramie, in the Powder River country. When she realized that her spirit was about to leave her body for the "Happy Hunting-Ground," she requested her father, the good, sensible, and powerful chief of the Brulé Sioux, to take her body to Fort Laramie, that she might be near her friends, the whites. Her request was carefully observed by her father, for after death her body was placed on lodge- or tepee-poles, attached to her favorite ponies, and conveyed by slow stages to the post, where it conspicuously rested for years; but a short time ago her bones were gathered and taken among her own people. Soon after her arrival at the fort, she was buried with great pomp. The officers and chaplain of the fort were all present in full dress and participated in the ceremonies, which were in strict accordance with the traditions of her tribe. Rich fabrics, in the way of blankets, squaw-cloth, etc., and trinkets of all kinds, were put within and about the outside of the box in which she was placed. Two of her favorite ponies were killed at the grave, and their tails and heads nailed to the uprights. The grave for a long time presented quite a gaudy and fantastic appearance, as the box containing the princess was wrapped in squaw-cloth of a rich scarlet color, and could be seen from its conspicuous position miles away. It has often been said that she was in love with one of the officers, and that she died of a broken heart, but this romance has never obtained the credence of those at the fort.

Those who have traveled through the Indian country, the Plains, must have noticed the elevated graves of the Indians, or the Good Indians, as they are sometimes facetiously called. The most prominent points along streams are the spots most frequently selected for the last resting-place of poor Lo. As a rule the Indian grave is erected with great care, and if undisturbed will stand for years before it rots and totters to the ground. It consists, generally, of four stout uprights,

whose upper ends are forked, and lower ones firmly set in the ground. Cross and side pieces are then placed in the crotches, and on them is placed a flooring of small poles. When the grave is thus completed, the deceased buck or squaw, carefully wrapped in blankets, buffalo-robes, and bark, so as to render it impervious to water, is laid to rest amid much smoking and speech-making. After the preliminary ceremonies are over, the grave is deserted by every one except near relatives, who remain to do penance by lacerating and mutilating their bodies. The squaws afflict themselves sorely. We have seen them gash their arms, legs, bodies, and faces, and while thus engaged shrieking at the top of their voices, throwing far into the shade the Irish wake. When they gash their foreheads, which they often do, they allow the blood which oozes from the wounds to dry and wear off by time. Sorrow is frequently manifested by cutting off the joints of the little finger, and, upon very rare occasions, the joints of other fingers. The bucks or warriors very often afflict themselves in this way. Those who die while journeying, or when there is no timber or trees to place them in, are packed on tepee-poles, which are fastened to each side of the pony and allowed to trail on the ground, forming a *travois*, and are carried along in this manner till they reach a river, creek, or some suitable burial-ground, as in the case of the Princess Spotted Tail.

The funeral ceremonies of the Indians are indicative of their belief in the immortality of the soul. It is a common belief among the Plains Indians, or those east of the Rocky Mountains, that after death the soul at once sets out upon its journey to the Happy Hunting-Grounds, or the abode of the Great Spirit, where there is a rich abundance of everything,—game, sparkling streams, and all other things that make the heart glad. They believe, also, that while the spirit is on its journey to this delightful abode it must have food and drink and clothes, the same as though it had remained in the body. This accounts for their custom of visiting the grave several days after the death of a relative with food and water, which they place at convenient places about the grave. The Indians believe that the dead consume the food and water thus placed at the graves, from the fact of their not finding it upon revisiting the place. They never think of the birds of prey that hover above them, anxiously waiting their departure. They kill ponies at the grave that the spirit may have a mount on the long journey. They believe if an Indian or white man is scalped he can never enter the Hunting-Grounds, and it is on this account they make such wonderful efforts to carry off their wounded from the field of battle.

Around this old grave-yard, which is now utterly demolished, some of the graves being moved a quarter of a mile farther north, can be traced the line of a breastwork, which of old was thrown up to resist the attack of Indians.

The Traders' Establishment was the next place of note. We

visited it. It is one of the very oldest adobe and stone buildings at the post. It was in existence long before the arrival of the military. It is now in the possession of a Mr. Collins, a business man of Omaha, and used as a trading establishment for the military, civilians living in the vicinity of the post, and Black Hillers.

Upon the occasion of our first visit to these parts in 1866, this establishment was presided over by Colonel Bullock, a genial, whole-souled Virginia gentleman, well known and appreciated by the oldest and youngest officers and the men of the Northwest. In those days a lucrative business was carried on with the Indians, who were encamped in large numbers about the post. The counters within the main room have been thus described: "They were a scene of surprising confusion. Indians dressed and undressed, squaws dressed to the same degree of completeness as their noble lords (?), papooses absolutely nude, slightly not nude, or wrapped in calico, buckskin, or furs, mingled with soldiers of the garrison, teamsters, emigrants, speculators, half-breeds, and interpreters. Here cups of rice, sugar, coffee, or flour were being emptied into the looped-up skirts or blankets of the squaws, and there some tall warrior was grimacing delightfully as he grasped and sucked his long stick of peppermint candy. Bright shawls, red squaw-cloth, brilliant calicoes, and flashing ribbons passed over the same counter with knives and tobacco, brass nails and glass beads, and that endless catalogue of articles which belong to the legitimate border traffic. The room was redolent of cheese and 'heap smoke,' while débris of munched crackers lying loose under foot furnished both nutriment and employment for little Indians too big to ride on mamma's back, and too little to reach the good things on the counter or shelves. The 'Wash-ta-lâ' (very good) mingled with 'Wau-nee-chee' (a very insignificant no good, whether predicated of person or thing); and the whole scene was a lovely episode, illustrating the habits of the noble red man in the mart of trade. Of course all these Indians were thinking sharply, and many gave words to thought, so that an unsophisticated stranger might well doubt whether Bedlam or Babel was the better prototype of the tongues in use. The Cheyenne supplemented his words with active and expressive gestures, while the Sioux amply used his tongue as well as arms and fingers in their forcible sign-language."

The foregoing is quite apropos of all trading establishments in the Indian country. Traders for the Indians are appointed by the Interior Department, and their positions, as a rule, are very lucrative. Robes and peltries of every description are bartered for a mere trifle, such as a few cups of sugar or flour. Military traders are now appointed by the War Department upon the recommendation of the Post Council of Administration, composed generally of three officers.

From the post-trader's it is but a few steps to the post-office, which is in one of the primitive adobe buildings. The interior is divided into

two rooms, one of which was used as the postal-room, and the other as the abode of Postmaster and Ordnance Sergeant Leodegar Schnyder, who marched here with the first troops in '49, and has been in this one isolated spot ever since. The sergeant, although now quite old and decrepit from long and faithful service, and a touch of the rheumatism, is still possessed of a good memory, and speaks fluently and knowingly of the early history of the fort, and of many officers who are now generals, but who when he saw them first, in the days of the old army, were only brevet second lieutenants. Something should be done for this old sergeant, who is now possessed of a large family. He has borne a good soldierly reputation, being ever faithful and reliable in the discharge of his duties. In the dark days of the Grattan massacre he did excellent service in hurrying the absent ones to the post. The old officers who knew him well should use their influence in securing him a second lieutenancy and immediate retirement. He has resigned the position of postmaster on account of not being able to attend to its increasing business. This will place him in very straitened circumstances; for this reason, therefore, we would say, be generous to the Old Sergeant.

The next place of interest visited was the gallows-ground, where, during the civil war, three Indians were hung for outraging and murdering white women captured from emigrant trains in the vicinity of the post. After a walk of three-quarters of a mile west of the post, and a little to the right of the old Fort Fetterman road, we reached the gentle eminence on which the gallows stood in plain view of the post. We could see from the rotten débris that the scaffold consisted of two ordinary uprights about ten feet apart, connected with the usual cross-piece at the top. On this gallows three Indians were hung at the same time, and, it would seem, in a most barbarous manner,—by means of coarse chains around their necks, and heavy chains and iron balls attached to the lower part of the naked limbs to keep them down. There was no drop: they were allowed to writhe and strangle to death. But true to the traditions of their race, they died stoically, and, as the red man always does when driven to the wall, bravely. Their lifeless bodies, swayed by every passing breeze, were permitted to dangle from the cross-piece until they rotted and dropped to the ground. We could see their bones protruding from the common grave under the gallows. The punishment of these Indians was no doubt just, but the mode of carrying it out was barbarous.

We were pleased to leave this gloomy spot and wind our way, by clambering steep bluffs, to the highest point overlooking the Platte River and the beautiful valley of the Laramie. We had no sooner reached the summit than our attention was attracted by a peculiar combination of stones, in shape like an arrow-head. We tried to conjecture its meaning or signification, but failed to arrive at anything

satisfactory. We presumed it to be a landmark or boundary point, placed there by the Indians of old, who, in the days of the Sublettes, were monarchs of all they surveyed.

From this high eminence a beautiful panorama was presented to our view. Looking to the west we could see the North Platte River coming through pine- and cedar-crested bluffs, and flowing on its tortuous way to its parent, and through it into the mighty Missouri. The thread-like line on its right bank marked the great route to Salt Lake and California, which, but a few years ago, was alive with travel and the historic Concord coach and its fiery steeds. Mark Twain, in a vivid description of this travel, says, "Once I crossed the plains and deserts and mountains of the West in a stage-coach from the Missouri line to California, and since then all my pleasure trips must be measured to that rare holiday frolic. Two thousand miles of ceaseless rush and rattle and clatter, by night and by day, and never a weary moment, never a lapse of interest. The first seven hundred miles a level continent, its grassy carpet greener and softer and smoother than any sea, and figured with designs fitted to its magnitude,—the shadows of the clouds. Here were no scenes but summer scenes, and no disposition inspired by them but to lie at full length on the mail-sacks in the grateful breeze and dreamily smoke the pipe of peace,—what other, when all was repose and contentment? In cool mornings, before the sun was fairly up, it was worth a lifetime of city toiling and moiling to perch in the foretop with the driver and see the six mustangs scamper under the sharp snapping of a whip that never touched them; to scan the blue distance of a world that knew no lords but us; to cleave the wind with uncovered head and feel the sluggish pulses rousing to the spirit of a speed that pretended to the resistless rush of a typhoon. Then thirteen hundred miles of desert solitude; of limitless panoramas of bewildering perspective; of mimic cities, of pinnacled cathedrals, of massive fortresses, counterfeited in the eternal rocks. And splendid work the crimson and gold of the setting sun; of dizzy altitudes among fog-wreathed peaks and never-melting snow, where thunders and lightnings and tempests warred magnificently at our feet, and the storm-clouds above swung their shredded banners in our very faces."

The travel over this famous route, from '49 to the building of the Union Pacific Railroad, must have been something wonderful. During 1850 a partial account was kept of all trains, etc., crossing the Laramie River below the fort, and the result was forty thousand animals of all descriptions. The book in which the account was kept was a year or two after unfortunately destroyed by fire.

It was along this route that the officers with a detachment of fifteen or twenty-five men used to escort the mail to Ash Hollow, where they were relieved by a similar escort from Fort Kearney. This duty had also to be performed to the west of the fort about a hundred and fifty

miles, to the bridge crossing of the Platte, where a large detachment was stationed to protect travelers. This duty was very arduous but equally necessary, owing to the frequent attacks of the Sioux, Pawnees, and Cheyennes, upon mail-carriers. Picard and Thomas were killed by them in 1849. All along the route, at intervals of fifteen and twenty miles, are to be seen the ruins of ranches or stage-stations, which used to be the resorts of the terrible Slade. This desperado, a division agent of the staging era, would kill a man without the least provocation, and those hereabouts that knew him in his glory wonder that he was not hung long before he was.

From our elevated position we had a fine view of Laramie Peak, the majestic queen of the Laramie range of mountains, wrapped in her robe of bluish vapor. The peak is five thousand nine hundred feet above the sea-level. The round trip to the top and down again takes about two days, owing to its shaggy surface and difficult climbing. Elk, deer, blue grouse, and other game abound in its vicinity. This isolated range of the Black Hills, of which Laramie Peak is the most easterly spur, is possessed of some magnificent scenery. Near the head-waters of the numerous small streams which have their rise in these mountains are a number of beautiful and picturesque cañons, and many of them are so deep and precipitous as to render them almost impenetrable to man or beast. The elk, deer, bear, etc., are here in large numbers and easily hunted. The Natural Bridge over La Prêle Creek is a remarkable freak of nature, and quite picturesque in appearance.

Descending into the lower valley on our return to the fort, we came to the civilian grave-yard, in which is the grave of John Richard, a half-breed. His father was a Canadian Frenchman, and one of the early voyageurs, and his mother a full-blooded Sioux squaw. John was born in the vicinity of the fort, and was sent to St. Louis to be educated. Being absent a few years, he returned to his tepee home sufficiently educated to do business and hold his own among the whites. He was everything a man living his mode of life could well be,—an Indian trader, government contractor, a good shot and hunter, and desperate. At the time the posts in the Powder River country were about to be abandoned and the country given up to the Indians, in accordance with the treaty of 1868, he conceived the idea of buying up all the government property that could not be taken out by the troops, and of transporting it into Montana for sale. On the day of the auction he was present, and, competition being weak, purchased several hundred thousand dollars' worth of property for a trifle, which he afterwards sold at a profit of about thirty thousand dollars.

Soon after this transaction, he was outlawed for killing a soldier without just provocation. This and other affairs damaged him seriously in the estimation of his friends, and he was ever afterwards considered a dangerous man. Being pardoned his crime, he was soon

after appointed interpreter to the delegation of Sioux Indians that visited Washington in 1869. It was not long after this that he met his terrible fate, the circumstances of which are about as follows:

In the year 1871, he and Mr. Ecoffey were partners in the Indian trade, and had hired a flat-boat to facilitate business. One day Richard and another half-breed took the flat-boat and went down the Platte River as far as old Red Cloud Agency, about thirty miles below the fort. During the trip down they imbibed freely of port wine, and by the time they had reached the agency their spirits were rampant. Richard, entering one of the tepees, found Yellow Bear and several other Indians having a pow-wow and passing the pipe around the circle. The greeting with Yellow Bear, a sort of a sub-chief, was anything but friendly, owing to an old feud or family quarrel. It seems that Richard had married the two sisters of Yellow Bear, and had discarded them after marrying the daughter of Nick Jonise, a man well known in this neighborhood. This, with Richard's demand that his two former wives should be given up to him, was too much for Yellow Bear, so with angry gestures and unmistakable language he ordered Richard from the lodge. The order not being obeyed, a quarrel followed, in which Yellow Bear was killed by Richard. The tepee now became a perfect pandemonium, and an Indian, whose name modesty prevents us from mentioning, sprang towards Richard and plunged his scalping-knife deep into his body; the other Indians followed and did likewise, and in a few minutes John Richard was a mass of blood and mutilated flesh.

As soon as Emily, the half-breed wife of Richard, heard of his terrible fate, she became wild and frantic with despair, and hastened to the scene of the tragedy. The sight of her husband almost broke the poor thing's heart, and her cries and agonized shrieks made the welkin ring. Seeing the hated body of Yellow Bear, she, in her mad fury, pounced upon it and tore it to pieces. It was at the grave of her husband that Emily showed her great love. The fury had left her, and all that remained to her was a sad and sobbing heart. She repeatedly embraced the coffin on her bended knees, and would not leave it until she was forced away. It was at Fort Laramie that John and Emily, but a few years before this sad affair, were married by the post adjutant in the presence of a large number of officers, and at the marriage all was joyous and happy.

A singular fatality has attended this family. There were two other brothers besides John who met violent deaths, and the old father, well known as a trapper and trader, was murdered in his sleep on Running Water, between Fort Laramie and Red Cloud Agency.

JAMES REGAN,
Lieutenant U. S. Army.

NAVAL EDUCATION.

THERE is, perhaps, to-day no subject of such vital importance to the service as this. Education is to the navy what the brain is to the body; like the brain it requires development, which can only be obtained by study. Our material in time of peace, owing to the mistaken economy of Congress, is very inferior. In the event of a sudden call to arms, our whole attention would be required to bring it to anything like an efficient condition. Therefore, though we cannot at present increase it and prepare it for war, we must perfect the efficiency of our *personnel*, so that when the hour of trial comes we may have the practical intelligence at hand necessary to create and handle our fleet.

We are probably unanimous in the opinion that we must be educated, but we have many different ideas as to what this education should be and as to how it should be obtained.

The life of a sailor, particularly that of a naval officer, calls for a great diversity of information; there is probably no other state of man that requires so much. This is not strange when we consider that we people two-thirds of the surface of the globe. On shore there are many different professions divided among the sciences and trades; at sea there is but one, which draws on almost all of them. Even the most intelligent landsman would scarcely be expected to be thoroughly proficient in every branch of knowledge and usefulness: can we look for more in the seaman?

CHAPTER I.

To consider the questions specifically we will begin with,

I.—The Officer.

In the old days when ships were propelled by sail alone, when gunnery was in its infancy, steam unknown, and navigation but a rule of thumb, a man of moderate intelligence could grasp almost all the requisite information; even then, however, we read of specialists, such as sailing-masters, gunners, and captains of men-at-arms. Now, with sails and steam, complicated ordnance and torpedoes, navigation, astronomy, geology, meteorology, hydrography, hydrology, electricity,

construction in wood, iron, and steel, and many other sciences, we have far more than even the most intelligent man can master thoroughly. All must acquire a knowledge of the practical application of every professional branch, a few must go to the roots of each and become experts.

The questions directly suggested by the subject in hand would seem to be,—

1st. What constitutes the education of a naval officer? A naval officer on account of his isolation must be at all times ready to turn his mind to any of the different branches of scientific and useful knowledge which apply not only to his own element but often also to terra firma. This covers nearly all that is known to man. His education must consequently be of a general nature as far as practice is concerned.

In order that any special duty may be thoroughly performed, it will be necessary to have the theoretical knowledge of an expert. As it could hardly be expected that one man should excel in every department, it would be necessary to have each little maritime family, formed by the officers of a ship, made up of a fair apportionment of leading men in the different branches. This reasoning would lead us to the conclusion, that to meet the present requirements of learning and the rapid strides that are being made on every side, it will be necessary for individual officers to devote themselves to the theoretical study of special subjects in order to derive practical results which should be common to all.

This education cannot be the same for all grades, on account of the difference in the nature of the duty to be performed. The younger officers, who are principally called upon to carry out the ideas and execute the commands of their seniors, must have a predominance of practical information. The middle grades must be able to plan as well as to execute. To the seniors falls the duty of revising and supervising the work, both practical and theoretical, of their juniors.

There are certain branches which apply only to certain grades or positions. What is useful knowledge to the youngster might be useless to the admiral, and what is useful to the latter might only be an encumbrance to the former. It would, therefore, seem that a system of progressive study is another of the complications which has to be met.

2d. How is this education to be acquired?

To meet the requirements stated, a method has to be devised which will first impart a general practical knowledge, coupled with only sufficient theory to make it clear, then a thorough and continued study of one or more of the professional subjects. Coupled with this should be a progressive elimination of obsolete matter and useless information, and a gradual introduction of the accomplishments required by a naval commander.

The plan which suggests itself to us to meet these requirements covers,

1st. A preparatory elementary course.
2d. A thorough general academic and practical course.
3d. A post-graduate course.
4th. Adoption of specialties.
5th. A judicious system of progressive examinations.

THE PRESENT SYSTEM.

Taking our present system as a basis, let us see what modifications will be necessary. The term of naval cadetship now covers six years. During these six years he is supposed, from the requirements of his final examination, to have learned to perform any duty, theoretically or practically, from the knotting of a rope yarn to the handling of a fleet. His actual ability to do all this is, however, doubtful. In four academic years of eight months each, the time devoted to actual study, he traverses in a remarkably thorough way all the highways and byways of a professional education, from English grammar to grand tactics. Do his meanderings leave, however, any definite impression? Does he not come from his journey in a dazed, confused condition? The majority of them will probably admit that they have.

This is not the fault of the academic authorities. In the first place, they have to take the best of the material sent to them, on which much time has to be spent in making up for the shortcomings of a common elementary education. Then they have to impart an entire theoretical and practical naval education, which they know will never be acquired by the great majority if not at this time.

How can this confusion, this result of inevitable crowding, be obviated? By requiring more information before entering, and a continuation of study after leaving.

A Preparatory Elementary Course.

It will be said, and justly so, that the standard of admission is now as high as it can be without causing the rejection of nine-tenths of the appointees. It is, however, very low when compared with that of similar educational institutions abroad. We, as a nation, are continually boasting of our public-school system, but if the examinations of some of the candidates sent to Annapolis are to be taken as its result, our public moneys must be terribly misapplied in some sections of the country. The private schools generally make a much better show. As it seems to have been decided that our navy should be officered from all classes, we cannot exclude the public-school boys, to whom a special form of education is legally opened. It appears that the same difficulty is experienced at West Point.

In view of these facts, it would seem expedient for the general gov-

ernment, with its greater and more uniform facilities, to attempt what the local authorities have failed to do. A national public school should be established, where pupils who had received proper appointments might be prepared for the navy, the army, the medical, the revenue, marine, and civil service. Failing in the project of a national school, a first-class public institution in each State should be selected, where a preparatory course might be carried on under properly chosen instructors. This elementary education being free would be open to all candidates. This school, or these schools, would soon pay for themselves, in the money saved to the government, by reducing the number of those found deficient at the entering, or still more so, at subsequent examinations. This course should include the following studies:

Mathematics as far as calculus,
Geography,
History,
Astronomy,
Drawing and Sketching,
Elementary Physics and Chemistry,
French and Spanish,
Grammar and Composition,

and the following physical exercises for the naval and revenue students:

Calisthenics, and Setting-up Drill,
Swimming, Rowing, and Fencing,
Infantry Drill.

Great attention should be given to moral training, and to inculcating habits of order, obedience, economy, and cleanliness.

The successful graduates would be fully prepared to undertake the proposed academic course.

It will probably be asked by some persons, Why not send the pupils to the existing institutions at an earlier age? It must be borne in mind that once entered at the academy, the government virtually assumes all the expenses of the pupil, and even more. Experience shows that sixteen is the best age for entry and association with the older cadets. The pupils at the preparatory school would all be younger, and would be defraying all their expenses except the actual tuition.

A thorough General Academic and Practical Course.

The time saved by this preparation, and that which is proposed to be saved by subsequent study, would allow the academic course to be reduced to three school-years of eight months, and three practice-cruises of three months; this would leave one month in each year for leaves, two weeks to be given at the end of each cruise, and two at Christmas, if merited. All the candidates should be examined before the end of

the academic year, the first cruise taking place immediately on entry. As some boys coming from private schools might be competent to pass the entering examination, they should be admitted, a proficiency in the practical exercises being, however, also required.

The academic course should include the following branches:

Seamanship. A thorough course, from the marlinspike to the quarter-deck. The handling of all kinds of boats. The signals of every description in use in the navy.

Gunnery. To be able to handle and describe every article of ordnance equipment. To be able to instruct men in their use. A thorough knowledge of all the drills.

Navigation. A thorough course.

Surveying. Elements of hydrographic and topographic work.

Steam. To be able to handle and run machinery, whether used for propelling, steering, hoisting, or working guns and torpedoes. Machine-shop work, especially for ordnance and construction.

Electricity. A thorough general course, and a particular course in regard to its application to lighting, signaling, telegraphing, and ordnance.

Physics and Chemistry. Especially as applicable to the naval service.

Mathematics. The higher branches, beginning at calculus, and including its application to seamanship, ordnance, and construction.

Naval Construction. In iron, steel, and wood.

Naval History. Especially English and American.

Regulations. Naval and naval etiquette.

French and Spanish.

Drawing. Hydrographic and mechanical.

The practical drills and exercises to be carried on in connection with the above. At drills and practical exercises care should be taken not to force the proficient to go continually over the same ground. Proficiency, if continued, should exempt the student from all but general exercises. As far as possible the seniors should be employed as instructors for the juniors. They would in this way gain practice in instructing others, which is after all the object for which they are taught.

The ships for the practice-cruises should be small, light vessels of the present period, fitted with all the modern improvements. The squadron should be attached to the practice-fleet to be referred to hereafter.

At the end of the academic course the cadets should be sent on a three-years' cruise in a large ship. The number should always be such that the regular duties could be thoroughly performed without interfering with a proper amount of study.

During this cruise they should be closely watched, care being taken to instruct them thoroughly in the customs and etiquette of the service;

they should be encouraged and assisted in their studies, in which they should be examined occasionally by officers regularly detailed as instructors to assure progress; they should be made to navigate constantly, to take the deck, instruct the men, and especially the boys; they should keep journals and sketch-books,—not the time-honored copy of the log-book, but intelligent journals, with their own impressions and descriptions of objects and events of interest; these should always include weather observations and forecasts. The old and tedious custom of making copies of the watch, quarter station, and fire-bills should be discontinued. A properly-printed form-book, such as used in the English service, should, however, be filled out and kept corrected. Each officer who comes in regular contact with them should mark for aptitude for the service officer-like bearing, intelligence, and obedience; those detailed as instructors in the different branches marking on the progress in their specialties. All these marks should be given great weight in the final examination of the cadet, which should take place at the academy on returning from this cruise.

A Post-Graduate Course.

This examination having been successfully passed, the cadet should receive a midshipman's warrant. After a short leave should return for eight months to the academy, undertaking a post-graduate course, which should include the following studies:

Ordnance and Gunnery. Theory of gunnery; construction of home and foreign ordnance and material; manufacture of explosives and projectiles, experimental work; pyrotechny and torpedo course.

Naval Architecture. Theory and practice.

International and Maritime Law, including naval jurisprudence.

Civil Engineering. A limited course in harbor and river improvements; construction of canals, breakwaters, docks, basins, buildings, and light-houses.

Geology and Hydrology.

Meteorology.

Pilotage.

The practical work should consist of that which should be undertaken in connection with the above studies, and of the instruction of the cadets at the academy in all their drills and exercises. The midshipman would assume in the academic organization the duties and positions now held by the cadet officers; after this course and a cruise of three months in the general practice-fleet they should be available for any naval duty.

The grade of ensign should be abolished, and promotions made directly from midshipman to master; the midshipman's warrant being replaced, after successfully passing the post-graduate course, by a reg-

ular commission giving him the present pay and relative rank appertaining to the grade of ensign.

The subsequent examinations should cover the ground previously passed over, bringing each subject up to date. It could hardly be expected that an individual should fulfill the latter requisite at his own expense and by his own unaided exertions, as the information could only be acquired by having access to many rare and expensive publications. Therefore there should be a properly authenticated monthly review similar to the French *Revue Maritime et Coloniale*, which would contain everything new of interest to our profession.

Adoption of Specialties.

The examination for lieutenants should differ from the previous ones, in the fact that an officer, besides passing the progressive examination, should be forced to show himself to be particularly proficient in some important branch. It might even be found expedient to give some slight addition of pay for excellence in more than one. A letter denoting the elected study would be placed after each person's name in the register.

In order to insure a fair division of knowledge in practical purposes, certain proportions should be permanently established between the different requirements; the man at the head of the list of masters waiving his examination if the vacancy were not in the branch which he desired to reach.

A Judicious System of Progressive Examinations.

After the examination for lieutenant, the progressive system should be continued, including progressive in the selected expert branch.

For the commanding and flag grades many of the minor details could be omitted to give place to new and more necessary accomplishments. For instance, great weight should be given to naval tactics, grand tactics, international and maritime law, naval regulations, diplomacy, and etiquette.

Any officer preparing for examination should, at his own request, be ordered to Annapolis, where proper single quarters should be provided for him, and full access to all the collections, laboratories, workshops, and libraries authorized. In this connection it might be well to urge the establishment of a proper ordnance and general mechanical workshop at that place.

STAFF CORPS.

So far our remarks have been confined to the line. It would seem to us that, as the number of officers embarked must necessarily be

limited, it would be well to have them all thoroughly effective. There is no reason why the paymasters and marine officers should not be regular graduates of the academy. If this were so it would give us several more effective general duty officers in every ship.

The engineer corps, on account of its important special duties, must always remain separate, as it requires an education of a special nature; it could and should, however, absorb the construction department, the duties of the lower grades being in common,—a few senior naval architects being permanently selected from the most expert in that particular. One of the great causes of non-advancement in our material is the fact that our naval constructors have never been to sea, and have, therefore, no practical knowledge of the advancing requirements of our profession.

ENGINEERS.

The education of the engineer should be relatively the same as that of the line-officer; steam and naval architecture replacing ordnance and navigation.

MEDICAL CORPS.

The medical corps must of course receive a special education. The requirements for all the departments of the government being the same, it would seem to us expedient to establish a government school of medicine, which should be kept at such a high standard that many civil practitioners would be willing to pay for the honor of being graduates. From this school would come the surgeons for the navy, army, marine hospitals, and quarantine service. This school should be modeled after Annapolis and West Point.

PROFESSORS.

Professors of mathematics should be selected from the best material in or out of the service.

CHAPLAINS.

Chaplains will always be appointed as they are at present.

INCENTIVES TO WORK.

Great inducements should be offered to officers to make themselves useful, by their inventions and writings, not only to the naval service, but to the country at large. Surveys such as those for the Isthmus Canal, and the opening up of the Amazon, reflect the greatest credit on our service, and do more to help us in the eyes of our countrymen than

we generally imagine. The "Tuscarora" and "Hasler" expeditions are familiar to every scientist over the face of the globe. Many useful inventions are due to naval officers; many more would be forthcoming were the facilities for experiment and hope of appreciation given to them.

In the French navy, which to-day is probably doing more to perfect its intelligence than any other, the ministry of the marine published, in 1872, an order (*Revue Maritime et Coloniale*, October, 1878) requiring all young officers on shore duty for a period of six months to send in an essay on some subject germane to the profession. These essays are submitted to a board, who pronounce upon them. If the work is sufficiently complete, it is published for the general information of the service. The marks given for these essays count in the next examination of the essayist. This would seem to be producing excellent results, if we may judge from the character of some of the publications. It certainly forces officers to study up certain subjects, and if the work is well done it is rewarded. Such a system, coupled with liberal competitive prizes for certain subjects, selected by the department, might bear excellent fruit in our service, where there is certainly much talent to be found if it is only fostered. Appreciation begets exertion, which develops facts and results. It is not a rare thing for an officer ordered to use scientific instruments to improve upon them, or even to invent better ones. Belknap's and Sigsbee's improvements in sounding apparatus are two of many examples.

Many of the appliances in use in our ordnance and torpedo branches are the inventions of our own officers.

This talent existing, might it not be a good idea, if a machine was required, to offer a prize for the best plans and specifications?

NAVAL TACTICS AND SEAMANSHIP.

If we are to have in the future fleet actions and manœuvres, something should be done to keep up the practical knowledge of naval tactics. That this is necessary, was made most evident by the way in which the Key West fleet was handled. Theory is a good thing to invent manœuvres, but practice, and much and continued practice, is absolutely necessary to carry them out. This practice we would propose to obtain by means of a home practice-fleet, which should be kept together during the summer months. This fleet to consist of the Naval Academy practice-squadron, the training-ships, the ships of the home station, and all ships intended as reliefs for foreign stations. The steam-launches of these vessels would form an inexpensive practice-fleet for the officers when it was not considered practicable to use the ships. With the launches fitted with buffers and dummy torpedoes, ramming and torpedoing could be carried on.

ORDNANCE AND GUNNERY.

Officers studying in this branch should be detailed for shore duty and instruction at the ordnance works, experimental battery, and torpedo school at Newport.

NAVIGATION.

The coast survey, hydrographic office, and naval observatory would be the best school for this specialty.

MECHANICAL APPLIANCES.

The study of mechanical appliances is one which is assuming greater importance every day. It is true that we, with our enforced retention of obsolete appliances, have kept wonderfully clear of these innovations, but others have adopted them, and if we wish to keep pace with other nations we will soon have to put them in general use. Ships are now gotten under way and steered, guns and torpedoes worked, boats and other weights hoisted, by machinery. The officer commanding these evolutions must be capable of constructing and repairing the machinery used in them. Every sea-going officer must therefore in the future become a practical engineer, or else the practical engineer may become the naval officer.

LANGUAGES.

French and Spanish are of the greatest use to an officer, not only in carrying on his duties in foreign parts, but in acquiring a knowledge of the countries, the people, their habits and commercial wants, and in reading the works of foreign authors and essayists on professional subjects. It would, of course, be best to have a thorough knowledge of both, but a thorough knowledge of one is better than a confused idea of both. Some men are natural linguists, and can acquire many languages. This would make them experts in this branch, and would render them of the greatest service to the government in collecting information.

SHORE DUTY.

If officers could be sure of being detailed for shore duty in the branches for which they had fitted themselves, it would be an extra incentive for them to make themselves proficient. Nothing discourages a really intelligent man so much as to see others placed in important positions, and doing nothing, where he could do much.

NAVAL RESERVE.

In war-times it has always been found necessary to reinforce the regular corps of officers by appointing volunteers. Heretofore these volunteers have come to us either perfectly "green," or with a very slight knowledge of naval duties. In the future it will be difficult to make this reserve of the slightest use without a long period spent in instruction, on account of the constantly-increasing complications of maritime warfare. Something should be done in time of peace towards imparting professional knowledge to this body.

The sources from which we must look for aid are ex-naval officers, the retired list, the revenue, coast survey, and merchant service, yachtsmen, civil engineers and machinists, the medical profession, and a few civilians.

Those who would serve in time of war would probably be willing to prepare themselves in time of peace.

Volunteer corps of line- and staff-officers should be formed, regularly graded, and added to the navy register. To gain admittance to these corps it would be necessary to pass an examination before a board, the entering rank being determined by the calibre of the examination. Subsequent promotions should depend on increased knowledge, coupled with a fixed period of active instruction or service for each grade. In addition to the regular corps of the navy the reserve should have corps of artillery, riflemen, and torpedoists.

The officers should be formed into classes, which should meet at certain times and places for theoretical and practical instruction from competent instructors detailed from the regular officers on "shore" or "other duty." The class in each district should be under the command of an inspector of reserves appointed from the commanding grades of the navy, or, if possible, from the reserve itself.

The whole being under an inspector-general of the naval reserve.

To the reserve officers should be intrusted the instruction and command of the naval-reserve men, when not employed in the regular service.

To facilitate the course of instruction these officers should be attached to the nearest naval station, where all manner of appliances should be at hand. They should be furnished with all the service publications and information, and for a specified period in each grade should be attached to vessels of the practice-fleet. As the vessels of the revenue and coast survey services and many of the steam-yachts would be very useful as dispatch- and torpedo-boats, they should be furnished with complete outfits, and the officers and owners encouraged in exercising with dummies. The yachtsmen should be induced to join the practice-fleet with their vessels.

For the marine artillery and rifle corps practice-batteries or gun-boats, drill-sheds, and ranges should be provided.

The engineer officers should follow relatively the same course as the line, instructing and commanding bodies of reserve machinists, firemen, and stokers.

The medical corps would only need to get their sea-legs in working order.

As these persons could hardly be expected to give their time for nothing, they should be put on the same relative footing as the militia, receiving, however, on the certificate of their examiners, a small allowance each year, and being paid the full pay of their grade when on active service.

CHAPTER II.

II.—Men.

The second heading of our object is much more difficult to treat than the first, and second only to it in the order in which we have to place it. In the olden time the sailor's rôle was very limited. He had to be a good seaman, or as the shipping articles have it, even to-day, he must "reef," "hand," and "steer." Now, however, everything has changed. Sails have assumed a secondary place as a means of locomotion. The old capstan and rope-messenger have been replaced by steam-gearing and chain or wire cables. The wheel and tiller-ropes are replaced by a small steam or hydraulic engine, with which one man can steer the largest ship in the heaviest weather. Soundings are taken by scientific contrivances. The lamp-trimmer is giving way to the electrician. The old gunner, who slapped the breech of his gun after sighting through his thumbs, and gave her another notch for luck, is replaced by the quiet officer in the conning tower, with his eye on his sights and his thumb on a little electric button, which can at any moment cause one or more immense breech-loading rifles to roar in modern echo to the long thirty-two of yore. In fact, in almost every action of daily life aboard ship the good old man-of-war's men are disappearing, and in their place a few intelligent men only are required to work the largest ship with all its appliances and appendages. In our navy, it is true, we still have employment for dear old Jacky, but he will not probably outlive the necessity for him. The naval seamen of the future will be fewer in number, and of an entirely different stamp. The mere fact of the great decrease in the number of sea-going men will force us to adopt all manner of labor-saving contrivances. To work these something more than a stout heart, a ready hand, and a sharp eye will be required: brain must be

developed to control the other necessary qualities. The development of this brain is the question of the day. Many of our best officers are working at the problem. The time when it must commence seems to have been generally placed during boyhood. We must educate our seamen as we educate our officers. That useful, but generally intelligent class of men, now known in the navy under that anomalous title of "landsmen," must soon disappear, to be replaced by intelligent young seamen, reared to their profession. The duties that will be required in the future of our men will be so various in their nature that, as we have suggested in the case of the officer, one man may not be able to master all thoroughly. In every community or ship's company, however, we must find representatives of all. One of the objections generally put forward by the unbelievers in the system of educating boys to become our seamen is, that as soon as they can these boys will leave the service. This objection is not, however, made in the case of officers, to whom it might equally apply. The officer remains because he becomes attached to his profession, because he is sure of a certain income, and sometimes because he thinks he could not get along anywhere else. Why should not the man remain also, if he is properly treated, assured of permanent employment, gradual advancement, and looked out for in case of injury or old age? He undoubtedly will, and this educated young American will make a much more reliable and trustworthy naval seaman than the mercenary of former times.

RECRUITING.

There used to be a general impression that only the black sheep and "ne'er-do-wells" should be sent to the school-ships; this is not the material that we want. We want the general average boy of the working classes; and, if my information is correct, it is this class we are now getting. The boys as now recruited are taken from our large seaboard cities, and probably this will always be found the most productive means of supply, as in the cities the surplus population is always the greatest. The system is working its own results. Instead of the old idea that the navy was a kind of a receptacle for all that was bad,—an idea circulated by cheap literature with its favorite heroes, who were so wicked that they could not live ashore and therefore ran away to sea, and by town authorities and philanthropists, who attempted to send us their worst cases,—the new and true one is gaining ground among parents that the navy is a very good and respectable means of livelihood, in which they can start their sons with safety, no matter how small their funds may be. It is to be hoped also that the present care will always be used to prevent hard cases and unintelligent or unhealthy boys from entering. The more we can elevate the sailor, morally, mentally, and physically, the better it will be for our service.

There is no reason why good men should not be as happy and contented in the navy as in any other profession. On the contrary, there is every reason that they should. They are relatively better clothed, fed, lodged, and treated than they are on shore. Those who are over them are restrained by strict regulations from any power of personal oppression. The regulations governing leave and other indulgences depend entirely on their own individual conduct. Even these would probably be greatly increased were men all of the class we hope to have in the future. As it is, a man-of-war's man has far more time to himself than a mechanic in like circumstances on shore. That the present system is working well is amply proved by the condition and general usefulness of the boys turned into the general service from the school-ships. For the future navy, however, we must devise a scheme to supply us with men of even greater intelligence. In Europe many plans are in operation, with more or less successful results. The seaman gunner of the English navy is probably the most encouraging production.

The French have a good theoretical system, but its practical working is thwarted by compulsory service, which is consequently generally of short duration. It gives them, however, a large naval reserve of trained men to draw from in war-time, whereas the English reserve is very small, most of the seamen becoming continuous-service men.

The merchant seamen of England and our country are becoming fewer and fewer every year. The smallness of wages asked by Germans, North countrymen, and Italians is driving the Anglo-Saxon race on the shore.

TRAINING OF BOYS.

With these facts in view it would seem expedient for us to train as many boys as we can, so that in time of need they may form a cadre of leading men in all the different branches,—the bone and sinew being made up of recruits or replaced by mechanical contrivances. Another fact that urges us to this conclusion is that the merchant seamen, even if we can get them, will be of little more use than a new recruit aboard a modern man-of-war.

As we can hardly expect to find in even the best material which may come to us greater intelligence than we have accredited to our officers, it would seem necessary to divide our men into trades and branches; all hands being, however, sufficiently instructed in general principles to work the ship and fight her guns.

INCENTIVES.

Hope of reward is undoubtedly with most men the strongest incentive to work. Without its influence in some shape even the best men

become laggards, only moving when they are told to. In a military service, promotion, increase of privileges and pay, are the most beneficial, especially so when combined with a system of special prizes for marked excellence.

PROMOTION.

As promotion would naturally carry with it increase of privileges and pay, let us first see what might be done with it. The old apprentice system was killed by holding out to those boys who excelled appointments as midshipmen to the Naval Academy. Those who did not get them became discontented with their lot; those especially who entered with this sole object in view. The consequence was that few remained in the service in the way that it was intended they should. This was a mistaken policy, but it gave us an excellent lesson.

Promotion to the position of warrant-officer should be the goal for which every enlisted boy should strive. In order to work this question of promotion into our subject, we must touch upon that organization. The warrant-officers at present include boatswains, gunners, carpenters, sail-makers, and a certain number of mates; to these we could add paymasters' clerks and a proportionate number of machinists.

Starting with these seven classes of warrant-officers, we can divide the petty officers and men of a ship's company into a like number of trades; the individuals in each class being especially educated for it, but at the same time receiving a practical course that would fit them for general ship's duties.

The *personnel* could be divided into these classes as follows:

Seamanship.	Gunnery.	Navigation.	Steam.	Sail-making.	Artificers.	Supply.
Boatswain. Ch. B. Mate. B. Mates. Capt. F. Castle. Capt. of Top. Seaman. Ord. Sea. Boys.	Gunner. C. G. Mate. G. Mate. Qr. Gunner. Gun. Capt. Sea. Gunner. Ord. Sea. Gunner. Boys.	Mate. Ch. Qr. Master. Ch. Sig. Man. Qr. Master. Helmsman. S. Helmsman. Ord. Seaman Helmsman. Boys.	Machinist. Chief M. Mate. Mach. Mate. Leading Fireman. Lead. Stoker. Sea. Fireman. Ord. Sea. Fireman. Boys.	Sail-maker. C. Sail. Mate. S. M. Mate. Leading Canvasman. Canvasman. S. Sail-maker. Ord. Sea. Sail-maker. Boys.	Carpenter. C. C. Mate. C. Mate. Leading Artificer. Artificer. Sea. Mechanic. Ord. Sea. Mechanic. Boys.	Clerk. 1c Yeoman. 2c Yeoman. 1c Store-room. 2c Store-room. Any of other classes.

All the duties of the ship could be divided among these different classes.

EDUCATION OF THE BOY.

The instruction given at present aboard the school-ships seems to be most thorough and excellent, although it differs slightly aboard the different ships. A common head of the system, or inspector-general of training-ships, would remedy this slight evil. In the future more

attention will have to be given to the study of mechanical appliances. The primary education of all the boys should be the same. Those showing special mechanical skill should be further educated as artificers and machinists. Those intended for the engineer's force should be particularly instructed in handling machinery and boilers, being sent every day while in port to work in the machine-shops on shore. These boys will not be able to fulfill the arduous duties of stokers. It will be necessary to employ special men for this part of the work, unless some mechanical means is contrived to do the work, or some other and more easily-handled material replaces coal. As, however, this question does not come within the province of this paper, we gladly turn it over to the proper authorities for solution.

The school-ships should be of two classes,—cruisers and station-ships. The old frigates, some of which are now used for the purpose, would make excellent station-ships for use as winter quarters. The cruisers should be small, completely fitted modern vessels, similar to those proposed as practice-ships for the Naval Academy. The station-ships should be spread along our coast-line as near as possible to the centres of the recruiting districts, which should be established.

Small masters and sailing-vessels for practice in fine weather should be attached to the stations. It might be found best to forward the recruits from the extreme northeastern coast to warmer quarters. The cruisers should be laid up in the winter, during which time any repairs or overhauling that they might require should be done as much as possible by the boys.

A boy of fourteen, having successfully passed his entering examination, which should consist of a general test of intelligence, physical and moral fitness, should be received aboard the station-ship. He should be attached to her for two years, unless discharged for bad conduct or marked inability to acquire the rudiments of his profession. The course should be as at present, with the modifications already suggested. The summer months should be spent in the cruisers, which should form part of the general practice-squadron.

During the stay aboard the school-ships and afterwards in the service, if necessary, the boy should be taught to read and write, if he has not already become proficient. He should be taken through arithmetic, and assisted as much farther in mathematics as he might desire to go. American and English history should also be taught. Grammar would be a valuable adjunct. Good libraries should be provided in all ships, and the men and boys given every facility to use them. They should also be encouraged and assisted by competent officers in any further studies which they might have the capacity or desire to pursue. Swimming, fencing, and boxing should be required. Dancing and music encouraged,—nothing does more to make men contented aboard ship. Everything that is good in the old traditional naval stories and ballads

should be put in form for them. Sewing, tailoring, and fancy-work save many a penny, make a man independent and neat, and keep him out of mischief.

THE MAN.

The boys having been drafted into the service, their instruction should be continued under regularly detailed instructors, but in a judicious way, in order not to deprive them of the hours usually allowed the rest of the crew for recreation. As they become proficient and vacancies occur, they should be rated as ordinary seamen and then to seamen. The seamen should be specially instructed, by being temporarily attached to the station-ships and naval yards, for the corps of petty officers for which they have been chosen and show the greatest inclination. They should be allowed to assume the duties of petty officers temporarily. From seamen they should be promoted to the lowest grade of petty officer in their class, and then as vacancies occur, if still qualified, they should be regularly advanced. Extraordinary gallantry or proficiency should always be taken into consideration in filling positions. Having passed regularly through the different ratings and vacancies occurring in the grade of warrant-officers, the most intelligent and deserving should be promoted. This would tend to elevate the position of warrant-officer, and would recompense the faithful seaman. A man once promoted to a rate should not be broken except by sentence of a court. The persons selected for advancement should be subjected to a thorough examination by a board of officers. In case of failure, the next aspirant should be examined. Of course fitness for the position professionally should have the greatest weight in these examinations, but due consideration should be had for the man's general intelligence. A set of pocket manuals, such as are now issued in the French navy, should be prepared for each class of men. These little books would contain all the information necessary to educate seamen theoretically.

If it were possible, which it is to be feared will never be the case, most of the work in our navy-yards should be carried on by regularly enlisted men taken from these classes. This would greatly reduce the expense of the government and give the men a chance to become expert workmen and to live ashore occasionally.

Something like this plan would give us an intelligent class of enlisted men, who, having advancement continually in view, would strive to merit it. Desertions would be rare, and altogether the service would be greatly benefited.

REWARDS.

Besides the permanent rewards for excellence, it would be well to establish a uniform system of pecuniary rewards for particular excellence in any of the drills or exercises.

RESERVE.

In time of war the navy would have to be largely increased from the merchant service, yachting service, and longshoremen. Something might be done to educate these men to some degree of proficiency. In order to impart this information some organization would be necessary. We cannot hope to pass our merchant seamen through a course of drill, but by furnishing books, manuals, and arms to our merchant ships, and offering rewards for successful passages of examinations before boards of naval officers, something might be done. The yachtsmen might be brought to a certain extent under instruction, either by means of the plan suggested for the merchant service, or in conjunction with their masters, as proposed under the first heading of our subject. The longshoremen could be organized into companies of marine militia under officers of the reserve, for rifle practice and great-gun drill, and if the number at any one point were sufficient, small gunboats might be provided. The men from the revenue marine should be organized and thoroughly instructed in the same manner as those for the regular navy. As the men who man the coast-survey vessels belong to the navy, there seems to be no reason why they should not be made effective in the same manner. The light-house board has under its direction a number of steamers, which, with their crew, might be expected to form part of an educated reserve.

We would conclude with a few words on a subject coming under the general head of education, and which, if not attended to, may cancel the results of any amount of hard professional study on our part. We refer to the educating of our people to appreciate and take pride in our service. We often say that the people of the country do not understand or take any interest in us. This is not to be wondered at when we think how little we do ourselves to make them. Our nation is strictly a practical one. They have to see practical results before they will become interested in the machine; discontinue these results and all interest is gone. There is no class of men who travel and see more than we do, and there is certainly none which gives less useful and interesting information to the general public. An enforced report, which finds a resting-place in some pigeon-hole or, at most, is published in a Congressional document, which it is impossible to obtain, unless, having served to swell the revenues and pay the board bill of some retiring Congressman, it finds its way into the stock of a dealer in old paper or antiquated books, is generally all that comes from us as the result of a valuable scientific expedition, if perchance some enterprising civilian does not borrow our thunder and produce a readable article. What books of travel will mark our generation? What naval history of passing events written by a naval man?

Our people are generous, but thoroughly democratic; they like to think that they have something to do with everything. In view of this fact, why should we withdraw ourselves from them? Encourage them to come and see us; throw our ships and navy-yards open to them; have visiting days specially set apart for them, when they can come and see something of our actual life and exercises. Such little things as the parades of the naval battalions at the Philadelphia Centennial and at New York on Decoration-day, the cruise of the "Plymouth" up the Mississippi, and our marines at the Paris Exposition, did much to make us popular for the time being in those localities. We should exert ourselves to make the profession popular everywhere. A naval officer's or seaman's uniform should be a passport anywhere, instead of a thing to be stowed away in a locker and only worn when forced to do so. Well-behaved and neatly-uniformed men, going among the people and entering into their enjoyments and life, would be a source of pride to them, and soon break down the barrier which now divides us,—preventing the unfortunate individual, who, on some detached duty, is forced to appear in togs, from being looked upon as one of Barnum's zebras.

Our people are commercial in their tastes. What have we done to meet this peculiarity? Why should we not have done, for years, what Mr. Evarts is now forcing his consuls to do? Why should we not have acted as the outposts of commerce, keeping the main body informed as to the movements of the enemy? All these things and many more we could have done and must do if we wish to exist in this age of weights and measures.

T. B. M. Mason,
Lieutenant U.S.N.

EMPLOYMENT OF TROOPS IN GARRISON.

DEBARRED from the advantages which association in large bodies offers to the professional soldier of Europe,—unable from the very conditions of his military existence to acquire any practical acquaintance with many things which it will be peculiarly his duty to understand in time of war,—compelled, if he is ambitious to learn, to construct, with a sometimes untrained imagination, a theoretical idea of warlike engines and their apparel, it is not surprising that the ambition with which our young officer enters upon his career subsides under such influences into a condition of mere performance of routine duties. To know his tactics and be conversant with the forms of boards and courts-martial,—to understand practically what is required to enable him to execute with reasonable credit his daily duties,—to comprehend the intricacies of money- and property-papers,—and, as a corollary thereto, to be able to extract the sting from a statement of differences, and beard the Third Auditor in his den,—these, with an occasional rise to the demands of some such great revival as the recent target practice furore, constitute the substance of military life outside of the strictly scientific corps of the army. True, we have what is termed the theoretical instruction both of officers and men, and among a great many officers honest attempts at the acquirement of special knowledge are always being made,—attempts which in most instances are the more to be praised, as they are undertaken under every discouragement of lack of means, of instruction, and of encouragement. But to too many of our officers theoretical instruction both of themselves and their men resolves itself into a mere form, not really from any inborn distaste to such an occupation of the mind, but from an aversion to what are in effect mere abstractions. Their tactics they study with the interest which their daily application inspires; they acquire a knowledge of returns and reports through the frequent chastening of the accounting bureaus; but no man yet has been able to inspire in himself more than a faint interest in scientific knowledge, which has as yet been merely speculative. Treatises on military engineering, on the sciences which are the handmaids of the artillerists, on practical matters connected with the care and support of armies, are all at hand, and are nominally studied. Such text-books as General Orders prescribe for the instruc-

tion of the soldier are regularly galloped through year after year, until the dispart of the piece becomes a familiar though still unknown bogey, annually brought out to amuse such unfortunate non-commissioned officers and "intelligent privates" as are not happily on extra duty. What is the reason, then, of this indifference to knowledge which is certainly of advantage? It rests simply in the fact that no practical exemplification of it can be or is had, and that the mind revolts at the laborious storing away of useless rules and sterile facts. As one of the brightest thinkers among that galaxy of bright young men which revolutionized the thought of the England of this century expressed it, "It is not by hearing or *reading* about making shoes that a man becomes a shoemaker, but by trying to *make* them." Paraphrasing this, it is not in technical descriptions of intrenchments and field-works, of temporary bridges, nor in regulations for the execution of this and that duty that the soldier will acquire the knowledge of them, but in going to work and doing it. Now, as our regular army is, in addition to its function as a national police, presumed and expected to be the nucleus around which the volunteer forces of the country must gather in event of war, the store-house from which they are to be equipped with trained and experienced soldiers and officers, the army must become, as it were, a normal school, in which the country can seek with the confidence of certainty for well-versed teachers in the arts of war. It must be so far in advance of the militia forces of the country in the knowledge of those things which constitute the trained soldier that its claim to the province of leadership shall admit of no doubt. With each succeeding year the number of those who in our great volunteer armies obtained a practical acquaintance with war and its manifold requirements is diminished, and at the same time those who remain, by age, family ties, and the demands of business, are less inclined to assume its responsibilities and incur its dangers. Our hope, then, rests in a generation which is as unfamiliar with battles as their fathers of 1861, but between whom and the regular troops of this day there is not the same disparity as then existed. In tactics and the ability to handle their arms there is a wide difference between these youngsters and the youth which the guns of Sumter assembled. The influence of a great war has been apparent. All over the country, and notably in some States, an interest in military affairs has been inspired which has given us a militia that will require but little to transform itself into soldiers. This interest leads those who compose it to in every way improve themselves in drill and equipment, and to emulate, as far as their opportunities will permit, the professional soldier. Well drilled as many of them are, well armed and equipped, skillful marksmen, the regular forces of the country must attain to a very marked superiority if in the event of war they wish to assume the leadership which it should be their pride to hold. It will not be by simple knowledge of *drill* that this will be secured, but it will result, if

at all, from the officers of the regular army being trained soldiers practically as well as nominally,—men able to lead in all exigencies, prepared by previous training, practical as well as theoretical, to solve all questions which would ordinarily arise during the progress of a campaign, and to say authoritatively what should be done at any crisis. Such a class of officers—our future colonels and generals—can be secured not by any peculiarly rigid course of theoretical instruction (though it must not be understood that it is the purpose of this article to discountenance the study of sound military literature), but by a greater attention to instruction in the concrete. It is thought that no one will deny that no amount of study of tactics will produce the same results as actual drill in them. Let us, then, apply the same ideas as far as practicable to our other instruction. The resources of most military posts are ample without any further additions to secure to officer and soldier the means to perfect himself in many important branches of the soldier's profession; their improvement and that of their surroundings can be made the occasion at the same time of instruction to the garrison, instead of, as now, simply a task. The hours which are now given to a ceaseless repetition of the same exercises can be agreeably and profitably employed in learning many things which we know imperfectly in theory and propose to leave until an occasion shall arise to demonstrate our utter ignorance of. But to secure this instruction the minds of post commanders must somewhat change, and the conception of what constitutes a post must change also. The well-known lines as to "What constitutes a State?" may be aptly paraphrased,—

> "What constitutes a post? Not weeded walks,
> Nor fresh-trimmed garden-plots, nor whitewashed fence,
> But troops, well-tutored troops, these constitute a post."

It is the curse of our military life that the minds of commanding officers are too prone to look upon the improvement of their soldiers as soldiers as subsidiary to the improvement of their posts. That is perhaps to be expected when their capacity as commandants is gauged, as it is generally, by the trimness of the inanimate rather than the animate portions of their charge,—when the whitewash on the buildings which the soldiers inhabit condones for the whitewash on the clothes they wear, and the rectilinearity of the garrison roads serves the double purpose of testifying to the zeal of the commanding officer and simplifying the alignment of his troops. But while the post requires a certain degree of attention, it should not be to that extent that in making it beautiful and comfortable the military spirit and instruction of its garrison should suffer. The troops should be led to feel that their soldierly appearance and attainments are the first consideration,—the officers, that their instruction of their men should be such as to fit them for every incident of war. This consummation can only be secured by an

abandonment of the æsthetic, by a certain insensibility to whitewash, and by a greater variety of purely military employments. The great majority of our posts are so situated that exercises in practical military engineering are perfectly possible. Instruction in the making of intrenchments and field-works would certainly prove valuable and interesting. It is not necessary that these should be elaborate in their nature, but they should be practical, and not violate in their contour and dimensions the rules of the art. Their construction should be based on their relation offensive or defensive to particular points, and officers and men should be required to so construct them, and to give their reasons for such and such a trace and such a profile. Practical tests of their efficiency should be then made, if possible, by firing at them at different ranges with both musketry and field-guns. When Corporal Muldoon and his associates in their construction see that a rifle-bullet will either penetrate or only slightly impress itself on the work he has completed, he will learn a practical lesson which will prevent him from faults of omission and commission in some future of danger and fatigue. Many posts are located near streams where the means for constructing a temporary bridge are all at hand. With implements which are among the furniture of the garrison take Company A or B awhile from its ordinary drill, and let one or the other, or both, construct its bridge. Its members, officers and men, will learn in this direct application of their theoretical study more about the force of currents, the strain on timber, and the hundred and one little technicalities of bridge-building than they ever thought they would, and at the same time the special aptitude of each man will be discovered, their interest will be excited, the post will gain a new bridge, and no one will suffer but the post sutler.

Let the commanding officer assume that it is absolutely indispensable for him to have a working reconnoissance made of several miles of the surrounding country, and mounting one or several of his officers and non-commissioned officers, send them out to make it and bring the result in by nightfall. Such practice will make them expert in noting the lay of land, its salient points, and its availability for military operations. It will encourage the important habit of observation; it will train the eye to see and the memory to retain a more or less perfect idea of what otherwise would be idly scanned. Practice the packing of an army-wagon, the embarkation or disembarkation of animals, the swimming of horses over rivers, the crossing of bogs, the adjustment of the burden of a pack-mule, the right way to pitch a tent, the simple methods to obtain the width of a river. In practical tactics, or exercises in which the company or battalion act as if they were in the presence of the enemy, the officer in command should so manœuvre his men that each movement should be a practical illustration of what he would do on that particular ground, and its capabilities for offense or

defense should be shown, and the reason for each position set forth as far as practicable. On the skirmish-line, if a soldier takes a position which would be manifestly dangerous, or should neglect to avail himself of a protection which he could use properly, he should be checked, and the true purpose of and proper method of skirmishing explained to him. There are indeed simple means for a liberal education in war at the control of almost every post commander. He does not require a new text-book. He can apply the knowledge now at his hand and grow in military stature every day. He need not disgust any officer or man, save such as it is useless to waste his energies on. His officers will derive a new interest in their profession from their daily discovery of how many and varied arts combine to sustain it; his soldiers will felicitate themselves in that they are soldiers and not laborers, and in the variety of useful military employments thus offered them their morale will be increased, and the curses of a garrison life will be abated, while the commanding officer himself, conscious that his garrison is competent to undertake any task which will ordinarily arise in war, will receive with calm equanimity any strictures on the imperfect development of his whitewash, and pointing an appeased inspector-general to an alert and well-instructed garrison, can exclaim, like a new Cornelia,—

"These are *my* jewels."

H. C. CUSHING,
Captain Fourth Artillery.

THE ENGLISH NAVAL PRIZE ESSAY, 1880.

"NAVAL TACTICS ON THE OPEN SEA WITH THE EXISTING TYPES OF VESSELS AND WEAPONS."

By Captain the Honorable EDMUND R. FREMANTLE, C.B., C.M.G., R.N.

"Nil sine magno vita labore dedit mortalibus."

(Concluded from page 124.)

CHAPTER IV.—*Strategy—Tactics—A Naval Action.*

WHAT is a ship? is a question which the naval officer may ask as innocently as did one of the fairies in the play of "Happy Land." If the choice is considerable in weapons, it is far greater as regards ships of war. The "Duilio," and "Lepanto," "Admiral Duperré," "Redoubtable," "Peter the Great," "Inflexible," "Dreadnought," "Ajax," "Thunderer," "Alexandra," "Téméraire," "Northampton," and "Triumph" are all men-of-war, and are all armored ships, though the armor is differently distributed; and in so-called ironclads alone the various systems of armament adopted and advocated form fertile themes of discussion for the naval architect and the naval officer. The ships above referred to are, however, all large ships, and are all armored more or less on the modern principle of protecting the vital parts of the ship, while in the more recent examples side armor has been discarded altogether in favor of more complete protection afforded to certain portions. That the ships we have named, almost haphazard, would take their place in a line of battle few will dispute,[19] but what are we to say to rams, not only of the "Polyphemus" class, but other vessels, such as the "Hotspur" and "Rupert," and the French rams "Bélice," "Bouledogue," and "Cabére"? Then we have the Greek alphabet class of Chinese gunboats with their 38-ton guns, which some people believe to have sounded the knell of huge ironclads. Lastly, we have the "Lightning" class of torpedo-boats, and the modified second-class

[19] We are aware that the question of the proper place of the "Nelson," "Northampton," and "Shannon" has been debated, but we think that few will doubt that they are fit to take their part in a naval action.

torpedo-boats carried by our modern ships, whose part is presumed to be to act as skirmishers to a fleet.

We see each class in turn vehemently supported by public writers, who boldly upbraid the Admiralty of the day for their folly and short-sightedness in not appreciating the requirements of modern naval warfare.

Fortunately, we need but touch lightly on this thorny ground, which has been occupied by the last Naval Prize Essayist, but it is the part of strategy to distribute the forces at command in the most efficient manner, and some estimate must be formed of their relative value.

In Chapter I., when dealing with modern weapons, we summed up generally in favor of "ramming tactics," good broadside and moderate end-on fire, great speed as absolutely necessary for a ram, and the Whitehead torpedo strictly as an auxiliary.

Torpedo-boats will be chiefly useful at night, and in circumstances when in former days cutting-out expeditions or boat attacks were had recourse to, but in broad daylight such a mosquito fleet would have little chance against Nordenfeldts and Gatlings.

History has already shown us, in the actions between frigates and sailing gunboats, the terms under which an "Alexandra" or "Inflexible" would meet a hostile fleet of "Gamma's" in the open sea, and we cannot doubt the result.

The proper function of a navy is but too often overlooked in modern days, when the proud title of Mistress of the Seas has been practically undisputed in our hands since the beginning of the century, but it cannot be too frequently repeated that the object of any real naval war must be maritime supremacy. It is this that the Dutch under De Ruyter and Van Tromp disputed with us in the seventeenth century, and that the French under Tourville, Suffren, and Villeneuve again contested later. It is an old story now, and the object for which our naval heroes fought is too often forgot, or pared down to its lowest terms; thus even St. Vincent and Trafalgar have been described as actions due to blockades. We seldom appreciate the advantages in our possession, but foreign critics are more clear-sighted; as La Gravière expresses it, "*A quoi peut servir une marine? Je réponds sans hésiter, à occuper les grandes voies maritimes.*" To do this we require large vessels which can cruise and keep the sea, and of such ships our war fleet must mainly consist.

Mr. T. Brassey, M.P., who has given much attention to this subject, has pointed out the necessity for having ships of moderate size, and he objects to the Italian ships "Lepanto" and "Italia," which are 14,000 tons, as too large, and praises the Admiralty policy of building ships of not much more than 9000 tons.

We need not, however, pursue this subject further. Most people will agree that neither "Lepantos," "Dandolos," nor "Inflexibles,"

still less "Gammas" or "Deltas," are required for our ordinary fleet-ship.

The "Polyphemus" is a novel experiment in naval warfare; but if she attains the speed and manœuvring capabilities she is intended to possess, we believe that she will prove to be a most formidable opponent, and we could wish to see the experiment repeated.

Other and higher questions of strategy are not here subjects for consideration. We deal with warfare in the open sea, and it is unnecessary to examine what proportion coast-defense ships, gun-vessels, or unarmored cruisers should bear to the fighting fleet. That portion of strategy which concerns us is the elimination from the fleet of all those vessels which are *likely to be an incumbrance rather than a strength in* an action in the open sea, either from their weakness, their unwieldiness, their want of speed, or from any other cause, leaving a homogeneous fleet capable of acting together in concert. We may then lay down two postulates:

1st. That in any fleet intended for action in the open sea the ships must be so far alike as to be able to act together against the enemy in any tactical evolution which the admiral may require to perform.

2d. That if special ships, such as rams, gunboats, or torpedo-vessels' are attached to a fleet, they must act independently of other ships, according to a prearranged plan, in which their peculiar qualities may be best developed.

Leaving now all strategical combinations of ships or other modifications in tactics, which must necessarily be produced by the different qualities of the vessels of which a fleet is composed, let us assume, for the sake of simplicity, the tactics to be followed in a squadron or a fleet meeting another of equal force.

The ships are assumed to be ordinary ironclads of the "Hercules" class, capable of acting together at 10-knot speed. The problem to be solved is how one squadron, say of 6 ships, is to gain an advantage over another of equal force. In private life, and among some savage nations, it has been considered fair to give notice beforehand of any intended attack, so that it may be met on equal terms; but in modern times, war once declared, the tactics to be employed are on the contrary principle, and may be summed up in the following axioms:

1st. To surprise the enemy and attack him when he is unprepared.

2d. To overwhelm a portion of the force with the whole of yours.

We are not now dealing with the first of these axioms. Jomini,[20] the French tactician, elaborates the latter as follows: "The fundamental principle of war consists, first, in bringing the greater portion of the disposable forces of an army to the decisive point, whether of the theatre of war or of the field of battle; secondly, to operate in

[20] "Tableau Analytique."

such a manner that this mass of forces should not only be present at the decisive point, but that it shall be cleverly brought into action."

So far all are agreed; but if we attempt to derive inspiration from the numerous naval writers who have studied the subject of a naval engagement between ironclads of the present day, we are startled at the wide differences of opinion expressed, not only as to the strength of various formations, but as to the manner of fighting which will be adopted. As a rule, strong assertions have been made and decided opinions given, based on necessarily weak arguments and weaker facts. A victory (on paper) has been gained by the A's through ignoring the possible combinations of the B's. A very general belief, shared apparently by foreign writers, has been that fleets will clash together in line abreast, and that they will subsequently pair off to decide the action, forming a series of independent duels. A writer who has studied this subject historically views such a battle as "almost an impossibility,"[21] and he is not alone in representing the line abreast as a very "weak tactical formation." On the other hand, we have foreign authorities[22] advocating the line abreast as the only effective tactical formation, and objecting to the inherent weakness of the line ahead, while the English naval writer[23] who has given most attention to this subject prefers line ahead to any other combination. Of groups we have already spoken in a previous chapter, but it is certain that we cannot look to groups as furnishing a common ground of agreement.

Meanwhile, we are not disheartened at finding that there is no beaten road on which to travel, as we are convinced that by discussion and argument, and by such helps as the "Naval War Game" when adapted to squadrons, sound principles will at length be arrived at, the truth of which can only be shown by the crucial test of a naval engagement. It is not improbable that national characteristics may cause different nations to adopt different views of tactics, and that we shall be well acquainted with the strength and weakness of each other's formations when a naval war bursts upon us and the real trial is at hand.

If we view rather more closely the arguments used by naval tacticians, we shall see that after all they do not differ so much in the result to be gained by certain formations, but rather as to the weapons to be used to insure the victory. Thus Captain Colomb[24] proposes to gain an advantage by adopting the line ahead and practically "doubling on the enemy" by pouring a succession of broadsides from each of his ships into one or two ships of the enemy. Clearly, he proposes to win by his guns; and, though he speaks of ramming in certain contingencies, it is a secondary consideration. Captain Colomb may be right

[21] Mr. Laughton's Essay, written for the Junior Naval Professional Association.
[22] Admiral Bourgois, *Revue Maritime et Coloniale.*
[23] Captain P. H. Colomb, United Service Institution Lecture, 1872.
[24] "Naval Tactics," an article in "Naval Science," vol. i.

in his view of a general action, but he will scarcely support "line ahead" when, should the leader, for instance, be rammed, the rest of the squadron must be huddled up in a heap on the top of her, as specially suitable to ramming tactics.

If we study the views of the French writers, we shall see the same comparative agreement, accompanied, it is true, by a fundamental difference as to the part to be played by the ram. In their view of tactics the ram is the effective, if not the only, weapon; guns are ignored till after the first collision of the two fleets, which is assumed to take place in line abreast, for it is argued that any other formation exposes the leading ship to be rammed by more than one of the enemy. All must, therefore, be placed on equal terms, and this can only be done by the ships being ranged in line abreast.

On one point all tacticians are agreed,—namely, the great advantage which the attack gives. In a naval battle there is little time for consideration as the fleets approach each other, and still less opportunity of retrieving a disaster. Almost the entire force is brought into action at once, and a naval action rather resembles a charge of cavalry than a land engagement, where the troops are brought gradually into action, and where differences of ground and fortified posts afford opportunities for checking the advance and recommencing the engagement on equal terms. In naval actions, even in former times, the advantages of the offensive were always great, although it is true that they were almost neutralized in the eighteenth century by the supposed requirements of the line of battle; but if we wish for an example of the moral effect of a bold attack, we must turn to the almost plaintive report of Villeneuve to the French Minister of Marine after the Battle of the Nile, which is too long to quote here. He relates how the English fleet came in sight steering directly for the bay; how it was hoped that Nelson might defer his attack till the next day, and give time for better dispositions of the French fleet; and how the hearts of the French officers fell as they saw that their hopes were delusive. We need not dwell on the brilliant victory which followed, but in these days, with steam fleets, not hours, but minutes, will elapse after they are in sight of each other before the engagement has commenced. Let us, however, give our views of a naval action with 6 ships.

Taking the two extremes as crucial examples, A's squadron of 6 ships is in line abreast; B's squadron of 6 ships is in single column line ahead. The squadrons, being mutually desirous of engaging, steer towards each other. We will assume the ships in each squadron to be 2 cables apart. At 2000 yards the leading ship of B is only three minutes from the centre ships of A's squadron. A, observing no change of course on the part of B, forms the opinion that it is his intention to pass through the centre of his line, "doubling upon" the two centre ships, 1 and 6. It will be seen that the admiral of A has

placed himself in the centre of the line for better observation and command of the column.

A hoists plan F and slackens speed slightly, 2 and 3 instantly increasing speed and endeavoring to get into échelon with 1 on the signal being dipped. In about two minutes more, when B's 1 is at 900 yards distance from A's 1, the signal is hauled down. 4 and 5 instantly put their helms hard-astarboard; 2 and 3 give moderate port helm, taking care to pass ahead of 1; 1 and 6 receive the fire of B's 1, allowing her to pass them; 6 then turns to starboard, 1 to port, unless either should see a good opportunity of ramming B's 2. Fig. 10A gives the position of the ships on the signal being hauled down, and with B's 1 maltreated by the broadsides of two of A's ships, 2 and 3 probably rammed by A's 5 and 4, 5 and 6 threatened and in danger from A's 2 and 3, we do not think that A would have much trouble in bringing the action to a favorable issue. If, when at 2000 yards distance, B alters course 4 points to starboard with the intention of passing out 3, A hoists plan A, which simply directs a change of course of 4 points to port and an attempt to ram the enemy's leading ships; in this case all will depend upon the turn being made at the right moment, but it is evident that both squadrons are now in similar formations, and that there is no tactical advantage with either side. (See Fig. 11.)

On considering these figures again, we see a certain difficulty in the rigidity of a line of even 6 ships. In Fig. 10A we have endeavored to gain an advantage by working by squadrons or groups, omitting the two centre ships, and we think that the defense would be still stronger were the two squadrons 4 cables apart, which would thus enable the two centre ships to work with their respective squadrons, and the process of re-forming would certainly be facilitated. The signal would have to be hauled down when B's 1 was about 700 yards from A's 1. (See Fig. 10B.)

If we now consider the case of 12 ships, and place these 12 ships in line abreast, a formation which B's logical instincts have led him to adopt, and which we believe he will attempt to maintain under all circumstances, how are we to attack? Certainly not in line ahead, as we have seen that no advantage is to be gained by such an attack, which involves considerable risk. Two lines ahead would be better, but they are still open to the objection we have urged to the line ahead.

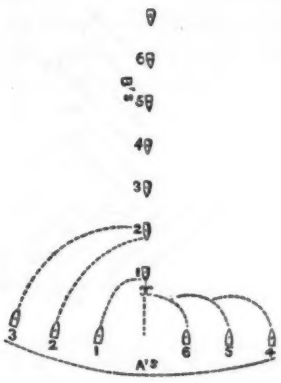
We have seen that the line abreast is too rigid a formation to maintain easily, and we think that a little consideration will show that it partakes of the strength and weakness of the old line-of-battle in the days of wooden sailing-ships and broadside fire.

Our own view is that if the line abreast is rigidly held, it can be forced without much difficulty by a squadron in any other order except perhaps line ahead.

An échelon of service groups would probably succeed in gaining an

advantage, and two lines ahead, if the columns were close together, would be superior to the one line abreast.

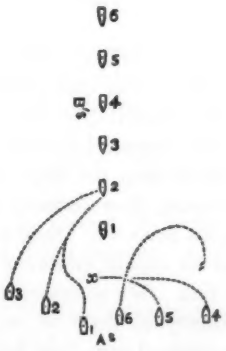
FIG. 10B.



In figure A's 6, 5, and 4 are supposed to arrive at the collision point x in the same time as B's 2, 3, and 4, or rather a few seconds later.

A's 2, 3, and 1 threaten B's 5 and 6 at about the place of B's 2.

FIG. 10A.



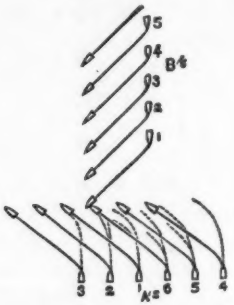
In figure A's 5 and 6 are supposed to reach the collision point x in the same time or rather later than B's 2 and 3.

A's 2 and 3 threaten B's 5 and 6 at about the place of B's 2.

In figure it is evident that A is at a disadvantage if he turns at the

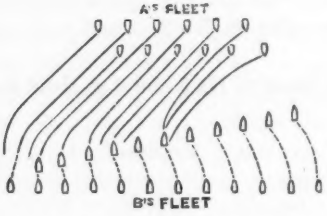
same time as B, and he should wait till B_1 is nearly ahead of A_1 before turning. Should B then attempt to carry out his manœuvre by turning to port, with line ahead, at the same time as A turns to

FIG. 11.



port to get into échelon, it is probable that B's last ships would be cut off.

FIG. 12.



To gain the full advantage of the enemy's weak formation, it is evident that we may meet him on his own ground whilst still opposing two ships to his one. We accordingly form in two columns of four groups or squadrons in line abreast, the rear column, or second division, occupying the interstices between the ships of the first line, the divisions to be 2 cables apart, thus forming nearly an identical line abreast, or French pelotons reversed. Now we prefer cutting off the enemy's wing ships, and we should endeavor to charge 5 ships from the right or left of his line. We accordingly alter course 5 points to starboard; and if the enemy attempts to maintain his formation by wheeling, we shall have attained our object before he has completed his movement.

Plan G has previously been made, the signal is hauled down, the course is altered 4 points to port, and in a few minutes the 5 port wing ships of the enemy find our whole 12 ships upon them in such a formation as to give them no possible advantage. (See Fig. 12.)

But it will be said, "You are assuming too much." B's fleet will retain its formation in line abreast whilst altering course together to prevent A's fleet from cutting off the wing ships. Let us assume that B alters course 4 points to port. It is now a trial of speed; and if A's fleet has the greater speed, he can choose to attack whichever wing he may prefer. Even if he has not this advantage, he may, by a sudden alteration of course, attack the right wing of B's fleet, or should he fail to obtain any tactical superiority, his formation is so superior that he may gain his victory by boldly cutting through the enemy's centre. We hold that there are many advantages in this formation. The attack in an open échelon will be nearly as effective as the line abreast; in an alteration in course of 4 points either way, the ships of the second line will have one of the first line ahead, which will tend to keep the formation, whilst in the direct attack each ship of the second division will be clear of the first division ships and be able to support their friends.

Such is our idea of an attack on a line abreast. Admiral Randolph's plan of two divisions in échelon working separately is admirable if we could be quite sure that the divisions would not be too much separated, but we prefer concentration to division, as involving few risks.

Against 2 columns in line ahead we should propose 2 columns line abreast, ships at 1 cable apart, and columns 4 cables apart. The ships of the second division to act with and support their opposite numbers in the first division. It is a formation which was adopted as a "*memorandum de combat*" by a distinguished French admiral during the Franco-Prussian war, the columns being 6 cables and the ships 2 cables apart.

To sum up our recommendations,—

(1) We prefer in all cases concentration to dispersion.

(2) We believe long lines, whether lines ahead or abreast, to be dangerously weak formations.

(3) We consider lines abreast or very open échelon the most favorable for ramming tactics.

(4) We work our fleet in groups for better subdivision and command, but we do not adopt the scalene-triangle formation as suitable for fighting purposes.

(5) We hold high speed as absolutely essential to tactical efficiency.

Such are our theories.

We will now endeavor to picture a naval action.

At last war is declared. To most people it was a relief to have it so decided. For months some of the principal nations had been "snarling at each other's heels." Confidence had long since disappeared. Trade was so slack, from fear of the enemy's cruisers, that

"Lean look'd prophets whispered fearful change," and "Rich men look'd sad," in expectation of the evils coming on the country.

The papers were full of recriminations as to the cause of the war, the only things quite certain being that somehow or other "we had drifted into it," and that two if not three of the most formidable naval powers in Europe had united, in the determination, if possible, to destroy the power and influence of this country by attacking her naval empire.

For once in recent years the fleet was all-important and received the larger part of public attention. Our colonies, our commerce, and our very existence as a nation depended upon the navy.

Foreign squadrons had been strengthened, fast cruisers, many of them converted merchant steamers, had been dispatched to the various maritime highways for the security of our merchant fleet; some attempts had been made to fortify our coaling stations which had been recently replenished with coal, and wherever British interests were threatened, and that was everywhere, cruisers were at hand to undertake their defense.

The larger colonies were ready and willing to protect themselves, but they wanted both ships and skilled seamen, and the Admiralty were almost bewildered at the demands made upon them.

Already 10 ironclads, as shown below, were in distant seas, besides 10 in the Mediterranean, but no more could be spared, as it was felt that the great struggle must be in the channel, where our opponents had cleverly succeeded in concentrating a force of 25 ironclads.

The following was the distribution of the fleet when war broke out, for the ironclads had been the first demand upon the dockyards, and, this task completed, the object was to turn out cruisers and repair the best of the old wooden ships, which had long remained in ordinary. The "Davy Jones," a sister-ship to the "Polyphemus," had just been completed when war was declared, and 4 similar vessels were building in private yards, but as they were too late to take an active part in the war we have omitted them from our list.

Channel Fleet, Headquarters at Portland.

1st Division.	2d Division.	3d Division (turret-ships).
"Alexandra," Flag of Commander-in-Chief.	"Agincourt," Flag of Rear-Admiral.	"Inflexible," Flag of Vice-Admiral.
"Hercules."	"Sultan."	"Devastation."
"Lord Warden."	"Invincible."	"Agamemnon."
"Minotaur."	"Northumberland."	"Dreadnought."
"Nelson."	"Northampton."	"Monarch."
"Bellerophon."	"Shannon."	"Neptune."

Rams.

"Polyphemus."
"Davy Jones."

Mediterranean.

"Superb," Flag of Commander-in-Chief.
"Téméraire," Flag of Rear-Admiral.
"Triumph."
"Achilles."
"Thunderer."
"Ajax."
"Belleisle."
"Orion."
"Hotspur."
"Rupert."

Foreign Stations.

"Warrior."
"Black Prince."
"Repulse."
"Hector."
"Valiant."
"Defense."
"Resistance."
"Audacious."
"Swiftsure."
"Iron Duke."

Home.

"Penelope."
"Glatton."
"Cyclops," and other coast-defense ships.
Gunboats.

The channel fleet was at last complete at Portland, where it had been assembling for some months. The commander-in-chief had been selected with due care, every confidence being felt in him, though he was said to have never seen a shot fired. The junior admirals and captains were all experienced men, who were believed to be good tacticians, capable of understanding their chief *à demi mot*, and it was believed that but one spirit animated both officers and men.

The composition of the channel fleet formed a fertile source of criticism. Some ships were too long, some too weak, some had no side armor, one was a mere wooden ship offering no security against torpedoes, and every diversity of opinion, from that of trusting entirely to "Staunches" and torpedo-boats, to that of confiding in "Inflexibles" and "Dreadnoughts," was represented.

It was certainly impossible to assert that we possessed a homogeneous fleet, but viewed separately the ships were extremely powerful, and it was hoped that their individual strength, and the known ability of the admiral, would compensate for any difficulty on the score of their diversity of character. In the turret division it was felt that we had an extremely powerful squadron, superior to any similar number of ships of the enemy.

In selecting the ships for the manœuvring fleet the admiral's opinion had naturally great weight, and he insisted on two qualifications as essential. He demanded an extreme speed of not less than 12 knots, and that the ship should be a ram. He was understood to attach great value to the "Polyphemus," and it was at his instance that her sister-ships were ordered.

The ships of the fleet at Portland as they arrived were put through a course of experiments as to their evolutionary powers, which were duly tabulated by experienced officers of the flagship. Each captain,

commander, and first lieutenant had in turn to practice handling their ship so as to ascertain her qualities and exercise their own faculties. It was surprising to see how all officers improved in the figure-of-8 practice round buoys, which was a part of the course, in a short time. The useful helm angle for each ship, to correspond with that of the flagship, was carefully ascertained, as well as "half helm" and "quarter helm;" and, notwithstanding the different natures of the ships, with constant practice and the care taken to tabulate results, every confidence was felt that the fleet would manœuvre effectively in concert. But little time was left after the whole of the ships had assembled for general evolutions, but that time was well employed, not in mere evolutions, but in tactical experiments.

In gunnery the admiral had persuaded the Admiralty to give him an old corvette, which was anchored near Portland, and prevented from sinking by Popoff air-bags and other camels under water, against which target ships were accustomed to try their gunnery efficiency.

In fine weather the hull was expanded by canvas screens to the size of an ordinary ironclad, and the shot-holes were found to have furnished some remarkable proofs of the value of end-on fire or otherwise, and of the effect of smoke from guns and funnels under different circumstances, as the experiments were carried out in imitation of actual warfare, all ships having to fire when approaching and receding at speed, etc.

Some trials of firing at moving objects were also carried out, large barges with canvas screens representing a small vessel being towed by one of the other ships. The comparative value of electric broadside and independent firing was also in this way made the subject of crucial experiment.

Some manœuvres of one division of a fleet against another to endeavor to gain information as to the effect of smoke on manœuvres furnished remarkable results. A large number of tactical signals found their way into the Signal Book; splinter nettings were in all ships secured to the ship's side; an outrigger torpedo on a special plan of a swinging boom working on a hinge under the fore chains, so fitted as to be rigid at 10 feet below the water-line and 40 feet from the ship's side, was directed to be held ready in every ship. These torpedoes were to be fired by electro contact, a special battery being used for them.

Such were a few of the preparations made by the Admiralty and the admiral, and fortunately in 188– time for preparation was given.

Some time before war had been declared the second division of the channel fleet, under a popular rear-admiral, was sent to cruise off the enemy's port. His orders were in the event of war to decline an action, but as the enemy boldly came out of port with only an equal number of ships the challenge was accepted. In fighting power the

enemy's squadron was not more powerful than our own, but it had a great advantage in manœuvring, the ships being similar in all respects.

The enemy being formed apparently in line abreast, but really (as subsequently ascertained) in a very open échelon, the admiral formed in service groups (scalene triangle) in line abreast, hoisting plan H as his signal for engagement.

The groups were formed to the right, and, it being observed that the enemy's ships were only a cable apart, the leaders of groups were closed to 2 cables.

The instructions by plan H were to "cut through the enemy's line, steering the same course as the admiral," the general instructions being,—"No. 1 to pass through without using the ram unless in self-defense; No. 2 to endeavor to ram an opposing ship of the enemy; No. 3 to cover No. 1." This instruction had been drawn up in view of the great length of three of the group leaders. "When through the enemy's line, ships to stand on about half a mile, circling round to starboard if possible to renew the action. Ships to follow motions of group leaders." "Ships to use electric broadside firing in commencing the action. Whitehead torpedoes as occasion offers. Bow fire not to be opened except by signal in approaching the enemy."

But little manœuvring was attempted, and the charge of the opposing lines began; the "Agincourt" had just fired her port broadside when a ship emerged from the smoke on her starboard side, and delivered a ramming blow near the mizzenmast with such force as to fill two of her after-compartments and damage her rudder.

A broadside was fired at the ramming ship, but, the guns having been laid 25° before the beam, only a few of them took effect, and a Whitehead torpedo was not more fortunate.

It was soon seen, both by the enemy's ship and by those on board the "Agincourt," that she was disabled and sinking. The former, having had her way stopped by the collision, was preparing to repeat the blow; but this had been anticipated, and two torpedo-boats were smartly lowered with steam up; these satellites, under dashing sub-lieutenants, devotedly threw themselves in the path of the enemy, forcing her to swerve from her course, and saving the "Agincourt" from further molestation till her consorts could come to her assistance.

How one torpedo-boat escaped and how the other was destroyed is well known; but the only two survivors of the latter have never agreed as to whether a shot from a gun, a Gatling, or a hand grenade destroyed the boat just as her torpedo was about to be exploded. It is only certain that her gallant attempt to blow up the enemy failed, and that the crew with two exceptions fell a victim to the temerity which had saved the "Agincourt's" crew at the expense of their own lives.

The action was now over; our remaining ships were but little injured, and the enemy did not resume the offensive. But in spite of

collision mats, sails hauled under the bottom, steam pumps, etc., the "Agincourt" was lost, though her crew were saved, and the first naval action of the war had resulted unfavorably for us. It was subsequently found that our opponents' instructions were to ram No. 2 of our groups, but that the captain of the "Redoubtable," finding that he was not observed by the "Agincourt," and seeing her great length, took advantage of his opportunity to ram her. Our No. 2 had attempted to ram another ship, so her attention was distracted, while No. 3, being on the port side, had been unable to assist her leader.

We need not refer to the outcry against the gallant admiral, but from this period groups were discredited. It was also found that the gray hue which all our ships had previously been painted was too colorless, and an order was instantly carried out to paint the ships black, with one broad white ribbon above the ports, to be carried right round the bow and stern.

How this defeat was avenged by the commander-in-chief it is scarcely necessary for us to relate in detail. How the admiral met the enemy, who was in his favorite formation of one line abreast, in three lines abreast, the turret division leading, with the rams in the rear, is well known, and how the three lines formed a sort of chequer-board, not being directly in the rear of each other, has been made familiar on every dining-room table. How, by altering course at high speed, the admiral succeeded in doubling on the right wing of the enemy, which he eventually bore down upon in échelon; of the mêlée which ensued, in which the "Polyphemus" and the "Davy Jones" played such an important part, and the relief which was felt in England as the intelligence of the brilliant victory was flashed through the land, is an oft-told tale, of which it is too early yet to write the history, but we add a few remarks on the lessons that were derived from the action.

We had taken six ships and sunk six ships of the enemy, chiefly through superior manœuvring of our ships at high speed, the ram being the effective weapon. We had lost another of the long ships through her bad steerage, thus setting at rest the controversy as to the loss of the "Agincourt." Gun fire proved itself most valuable in the single-ship actions, several of which were developed after the first charge, the turret-ships showing great superiority under the circumstances. In pursuit, too, the gun was invaluable. The Whitehead torpedo failed to act generally, though it was singularly successful on one occasion, the outrigger being, however, equally fortunate. The enemy's Harvey torpedoes were harmless.

It is well known that we captured six and sunk six ships of the enemy. Of those sunk, four may be considered due to the ram, one to the gun, and one to the Whitehead. Of those taken, three were due to the gun, two to the ram, and one to the demoralization caused by bursting of the outrigger torpedo. The lessons of the action are,—

1st. That a long line is a weak formation.

2d. That high speed is invaluable.

3d. That regular rams are most formidable in a general action.

4th. That smokeless coal is a great advantage, our admiral's determination to have only the best Welsh coal having been of considerable service in accurate signaling and station-keeping.

5th. That, on account of the smoke, it is most important, if possible, to attack the weather wing of the enemy.

Here our sketch would end but that a scheme of night attack, which was never carried out, has reached us; but as it appears valuable we give it as follows, premising that it is only a fragment, the Admiralty having very wisely gathered all the experience and tactical considerations of the late war into a confidential volume, to be issued to admirals:

"In a night attack with rams and torpedo-boats the fleet will be formed in two lines ahead, the ordinary number of cables apart, rams in line abreast between the lines, torpedo-boats astern or alongside their respective ships. Should the enemy discover the nature of the attack, the general recall will be made, the admiral's motions to be attended to, torpedo-boats hoisted up, if possible, rams to resume station.

"Boats not hoisted when an evolution is to be performed are to act independently of the fleet, under cover of reserve squadron. Should the enemy attack, the ships are to form in indented line at night, and, the action once begun, are to act with group leaders.

"If all goes well, and the fleet can approach the enemy sufficiently near before being discovered, at a given signal the fleet will alter course together, reversing outwards rams, followed by torpedo-boats, at full speed, charging the rear of the enemy, supposed to be in two or more lines ahead. After the first attempt, torpedo-boats will go out of action, retiring towards the enemy's original rear. The fleet, when boats are well clear, will probably again alter course together towards the enemy's van, and charge in indented line. Rams to act as may seem best during the action.

"After the first charge, unless a distinct opportunity for ramming is afforded, the ships are to endeavor to pick up their torpedo-boats and form in two lines, ready to renew the action after daylight."

We now take leave of our supposed naval war of 188–, and return to the style befitting this serious essay. We have not, we think, taken a liberty in endeavoring to depict the probable results and tactics of modern naval warfare. We have taken our navy as it is, or as it probably will be in a few years hence, and in this sketch we have endeavored to show where our weakness is likely to be, and to the best of our ability how and where it may be remedied.

That much has been left unsaid, that some points have escaped our notice, and that many subjects have been inadequately treated, we are

painfully sensible, but we have tried, as far as possible within the compass of this essay, to touch upon all those topics which are connected with naval tactics in the present day, and we have spared no pains, with the limited time at our disposal, to treat our theme worthily, as our motto, "*Nil sine magno vita labore dedit mortalibus*," suggests to be requisite.

Let naval officers only be true to themselves, in the spirit of the above motto, and we may feel well assured that foreign powers, who "cast a long look where England's glories shine," will also recollect, in the words of the same poet, that

> "Self-dependent power can time defy,
> As rocks resist the billows and the sky."

BITS OF ARMY ETYMOLOGY.

We seem to find, in pursuing the ancestry of present military speech through the best authorities within our reach, that the family connection of the word *ball* is about as extensive as that of the Virginia patriarch whose tombstone records that "His descendants are scattered from the Roanoke to the Rocky Mountains." The root of the word in question, furnishing a name for the thing thrown to and fro, and for the correspondent action, passes into *ballet* and *ballad* as a vocal accompaniment to dancing. So *bullet*, *bull*, *bolus*, *pill*, and *bill* are martial, medical, papal, and business missiles, those of paper getting name and authority from the pellet-like seals attached; *billiard* is a little, as *balloon* is a big, ball. Here belong such diverse things as *boil*, *bulletin*, and *bullion*, which seems to have originally meant that which was sealed or stamped, and then to have been applied to uncoined money. The *problem* of the student, the *parable* of the preacher, and the *parole* of the guard are further ultimations of the same root, and, finally, we see how naturally *ballots* may harden into *bullets* if a little Maine-ipulated.

The *blanket* we use is no longer white, nor so much of a *blank* in the matter of comfort as in the shoddy days of yore. *Bugle*, standing for bugle-horn, is resonant with the *bellow* of the *bullock*, and with but little else as frequently blown in our service by the graduates of the recruiting rendezvous. Nor is the *trumpet* always a *trump* card in garrison melody, as the noun affiliates with *tube*, but the adjective with *triumph*.

Bomb is a sonomime, and has perhaps an industrial brother in *bobbin*, but is no relation to bombazine, though full cousin to *pump*.

Barricades ought to be built of *barrels*, as these of *bars*. *Chance* should have nothing to do with the *cadenced* step, but etymology has tactics of its own in spite of the War Department.

Calibre contains the notion of *quality*, either by itself or compounded with weight, as seen in *librate*.

The *cuirassier* owed his name to his ancient armor of leather, *cuir*.

Culverin is a corruption of *coluber*, and was a name for a long, slender, snake-like cannon.

Brass is not confined to *Brazil*, but both spring from a root signify-

ing flame, the one as an alloy, that is, mixed *à loi*, the other as furnishing a flame-colored dye-wood. Here belongs *embrasure* as an opening whence flame appears.

Every one must have noticed the partiality of army sergeants for goats. Milk may have something to do with it, but it is more logical to assign as cause the affinity between the French terms for the animal, *chèvre*, and the *chevron* that establishes the sergeant's rank. Both radicate in *caper*, *capriolus*, which had a secondary meaning of inclined supports or braces of timber, like rafters; or, finally, like the bars of the decoration the sergeant wears. The fact that this worthy class of officials cut few or no *capers* is a proof of the powerful effect of discipline in counteracting the subtile associations of etymology.

The *blouse*, like the sash, came from Persia, but the *jacket* from the French peasant *Jacques*. In derivations, however, the doctors disagree as in physic, and so other authorities assign *blouse* to its color *blue*, in which case a gray blouse would be like a green blackberry. Jacket is also said to be a corruption of an Italian term descriptive of its construction in more troublous times, by overlapping pieces of metal upon cloth as a sort of defensive armor.

Comrade is roof-mate, the root signifying bent or crooked, as in the river *Cam*. In the days of the old barrack four-poster, a still closer contiguity found expression in the term "bunkie." To comrade also are affiliated *jambe* and our *gambol* as something specially exercising the legs, also *ham* and *gammon* as legacies of the pig. There is a duplicate of the latter word cognate with game only, as in backgammon. The *farrier* should be a worker in iron, *ferrum*, and the *surgeon*, contracted from *chirurgeon*, a hand-worker merely, but the routine complaints at "sick call" task the head and sometimes tempt the foot as well.

It may console some inquisitive dragoon to find that *spavin* and *sparrow* are affiliated, the former as being that disease which causes the horse to lift up its foot after the manner of the latter.

Another equine ailment known as *lampers*, and sometimes cured by burning, is assigned on orthodox authority to *lampas*, a derivation that, like the rhetoric of Demosthenes, certainly smells of the *lamp*, and which, if true, invests the word with the grandeur of *Olympus*, that bright mountain where dwell the immortals. *Lampoon*, originally signifying a drinking-song, comes from a root seen in *lap*, *labial;* and *lamprey* is from the latter form compounded with *petra*, signifying rock-lapper, with reference to the habitat of that fish.

Some may have wondered what loop had to do with *loophole*. The latter is a corruption of *louvre*-hole, and this again of the French *l'ouvert*, the opening. The *Louvre*, however, is related to *lupus*, and was once a hunting-seat, Lupara, as may be read in Brewer.

Toddy and *punch* are seldom heard of in our army, but originated

in the East Indian service, though their use at present is mostly confined to the vicinity of Bangor. The latter liquid gets its name from being compounded of *five* ingredients. General Neal Dow, however, thinks that one is enough. The name and the numeral are allied forms in spite of the fact that they have not a letter in common. The *Punch* that is found with *Judy* is said to be a corruption of *Pontius* Pilate, as his better half is of *Judas*, the couple being relics of something akin to the old Passion Plays.

And toddy reminds us of *toad*-eater, which is said to be a corruption of *todito*, or fellow of all work. Those who have been on the Pacific side of our continent have doubtless partaken of *jerked* beef, and know that the adjective is a corruption of the South American *charqui*, meaning sun-dried.

In Patagonia we hear of *barrancas*, a term employed to denote the bluffs along a river, exemplified in the terrace formations seen in New England. Fort Barrancas thus becomes the fort on the bluffs.

Our army bird, the *eagle*, has perhaps the signification of dark color in its name, *aquilo* being the black, cloud-laden, storm-wind, or there may be found in these words the notion of swiftness, equally applicable to both. The goose has the distinction of being *the* bird through the French form *oie*, *oiseau*, from *avis*. The English appellation comes from a root that means the gaper.

Aiglette and *ague* are associated in origin if not in actual occurrence. *Acuteness* is the radical notion, possibly with reference to the wearer of the decoration, or, at all events, to its sharp-pointed tags, as also to the sharp pains of the disease.

The *volley* is not so agreeable to digest as the *vol* au vent, unless the cook be from Cork. Connected here, too, are the *volante* of Havana, the *velocipede* of Central Park, and if along this line we pursue our verbal fugitives far enough, we should come upon *fowl* and *fly*.

The *noon*, so welcome to fatigue-parties, was the ninth hour, *nona*, and so by the Roman method of reckoning from 6 A.M. would not be due till three of the afternoon, but these stirring times are "considerably" ahead of classical conservatism. *Lunch* is a corruption of the French *l'once*, or eleven o'clock, and *dinner* has in like manner been assigned to *decima*, or the tenth hour.

A *filet* of beef and an *enfilade* fire resemble one another so far as one is a thread of meat and the other threads the enemy with a line of shot, the effect of which should be anything but *nil*, though in this word there comes again the Monsieur Tonson of the two with which we began.

Identity of form is no proof of common origin, as with the two verbs *to defile*,—one akin to *foul*, and one used in the sense of *filing* by, and belonging with the forms quoted above to *filum*, a thread. The instrument known as a file has still another source, but further illus-

tration would trench upon the field already filled by that celebrated sermon on the spirits of just men made perfect.

Challenge and *calumny* are quite naturally double forms from the same root, accusation on the one side *calling* out defiance on the other.

Hostage has nothing to do with *host*. The former is referred to *obses*, he who sits down with the enemy, while the latter, with *hostile*, *hotel*, and *ostler*, ultimate in a common root that passes through the signification of that which is foreign and therefore unfriendly, he who receives foreigners, place where received, and, finally, the groom who stood by. *Hospital* is a restriction of the same idea of entertainment to the sick simply, by the *hospes*, or master of the house.

Host, as used by the church militant, is another word, meaning that which is struck or slain, and so a sacrifice, and then applied to the consecrated bread viewed sacrificially. *Holster*, *hole*, *hull*, and *hell* all diverge from the idea of that which covers or hides.

The *tompion* which closes the muzzle of the musket is allied to the *tap* which opens the keg.

Drill is rather a *trite* than a *thrilling* performance to the veteran, and the recruit votes it a bore entirely in accordance with its original meaning. *Drilling* as a style of cloth is so called from the *three*-fold nature of its thread.

Calomel was not an unfamiliar article of army diet under the treatment of the heroic school. It is curiously named from its origin as a white powder got by heating a black substance, and literally the word means "fair-dark."

In former days there was a class of military folks known as *matrosses*. The word is more particularly applicable to those who sleep upon *mats* or *matting*. The *batmen* had to do with packing and pack-saddles, which were covered with a matting of *bast*, or the inner bark of the lime- or *basswood*-tree, hence the *bat*-horse; and here also he belongs who was entitled to a bar sinister in his coat of arms, for there have been worthy hidalgos who were yet sons of a pack-saddle. Skeat's dictionary will dissipate any darkness in the allusion.

The *lascar* of the Indian service means a camp-follower.

The word *campaign* is not logically entitled to describe our work in the woods during the last war. "No favor" each side did find, but seldom a "clear field." *Champagne* as the product, and *champion* as the hero, of the plain belong here, like the Italian *Campania*, which furnishes *campanile*, as pertaining to bells, first used in that district.

It was a frequent and a vicious habit to make *bonfires* of our old camps, but with little thought probably of the *bone*-fires in which the Protestant reaction of the sixteenth century consumed the relics that were formerly adored.

Postern is a back-gate, as *posterity* are those who will look back upon us, if they look for us at all.

Among terms that belonged to the art of fortification there are two of rather a droll character, if we may be permitted to approach so abstruse a subject in any other than the very gravest of moods. A slight rampart thrown up in the ditch about the main work was called the *fausse-braie*, or false-breeches, or the juvenile diaper. This adjunct, then, may be presumed to bear the same relation to the principal defense as that preliminary cloth to the grandeur of the true pantaloons. So a low wall about the base of the citadel was known as a *chemise*, probably from its furnishing the body of the place with so little cover.

A person may lead as *sedentary* a life in the *saddle* as in his office *chair*, but he will get less dyspepsia by it.

Dispositions both *sedulous* and *insidious* may be found at *sieges*, *assizes*, and in the *cathedral*.

The useful officer who spends his spare moments at the sewing-machine instead of the sutler's, will have heard much about "cut *bias*," which, he will be glad to recollect, is *bifaced*, and looks one way while suggesting another, like sundry politicians in a presidential year.

A word pervades the premises in mournful echoes about Christmas week,—*balance*, in which is the same prefix *bi*, with a root seen in *plank*, *blade*, defining the compound as the thing with *two plates*. By cultivating these etymological affinities our hero can at any time pass from financial *platitudes* to Platæa, and magnify himself with

"The glory that was Greece and the grandeur that was Rome,"

instead of shrinking to the contracted limits of grocery credit and sartorial trust.

Pedigree, *geranium*, and *cranberry* are three terms not peculiar to the parade-ground, unless the command chances to include some enthusiastic sport who is devoted to the *Spirit of the Times*, and keeps posted as to the record of the Goldsmith Maid, and who is thoroughly at home with the hieroglyphics of the turf register. He will be pleased to know that pedigree is a corruption of *pied de grue*, or crane's foot, with reference to the likeness between it and the forked family-tree into which genealogy is pictorially thrown. *Geranium* is the Latin equivalent for the Greek crane, based upon certain resemblances common to the plant and the bill of the animal; and *cranberry* is so named from a similar reason, or as the crane's peculiar food.

Podophyllum, or *foot-leaf*, might be mentioned here, as will be understood by any one who will look at the herb, and also our purslane in the French form *pourpier*, Latin *pullipes*, English chicken-foot. *Purslane* itself is another corruption of *portulacca*, which means milk-bearing; and while busy with plants we might note that *pink* is seldom thought of except as color, though the name originated in the serrated or *pinked* edge of the flower.

Botany is full of odd derivations and superstitions that should be treated by themselves. We stimulate curiosity with one, *mandragora*, or *main de gloire*.

Gabion, akin to Latin *carea*, is visible in *cage*, *jail*, *cajole*, the sense of hollowness settling into places of restraint and mockery of treatment.

To select *quarters*, to give *quarter*, are additional exemplifications of the fertility of a numeral, *quarter*, already alluded to. From its particular meaning of allotment into four parts it passed to that of a general allotment. The sense of giving *quarter* is variously accounted for, either as meaning to take to quarters, instead of killing on the spot, or as alluding to a custom of offering the *quarter* of one's pay for one's life, which looks a little doubtful, as in such emergencies people are not apt to trouble themselves with vulgar fractions. The luxury of scaling down ransom and doctor's bills is reserved for the leisure of convalescence.

Cartel, also used in connection with prison exchange, belongs with *card* and *cartridge*.

The hunter should not forget to associate in his preparations *plover* and *pluvious*, and is often compelled to recognize the *duck* as a *diver*.

Parrot and *parochial* also belong together, the former having been to such an extent an ecclesiastical pet in countries where the priest of the *parish* had no children of his own as to get its name thereby, more plainly seen in the intermediate form *parroquet*, a bird once as plentiful in the State of Ohio, by the way, as presidents seem to be now.

The *mite* of the widow and the *mitraille* of battle do very different errands, but are verbal kin, like the garden grape and its namesake inside the gun.

H. W. C.

THE MODE OF MANUFACTURE OF CABLE-IRON, CHAIN-CABLES, AND ANCHORS, UNITED STATES NAVY.

How few people know as they pass down the street and main entrance of the Washington navy-yard, and are greeted by the small signs "forging," "anchors," and "fagoting," placed over the doors of the long low brick building on the right, the amount of work that is done in this shop by the equipment department of the navy in turning out cables and anchors as well as heavy forgings for the engineer's department.

For years the navy has been supplied with anchors and cables from the Washington navy-yard, and since the new rolling-mill has been started in one end of this shop, and the Boston rolling-mill lying idle, it now turns out all the chain and most of the round iron used by the navy, waiting the time when the government shall decide to roll its own boiler-plate.

The quality of iron required for making chain-cables necessitates careful and excellent work in its manufacture; formerly all chain-iron was furnished under contract, but now none is bought, and the old and worn chain-cables, a gold mine in themselves, are utilized by being reworked and made into new cables. At present these old cables are stowed in piles at the yard, and with the present demand for chain-cables, and granting that cable-iron will stand the necessary reworking of from six to seven times without injury, the navy probably will not have to make any purchase of chain-iron for the next fifty years to come.

The saving to the government by the working over of these old cables can hardly be realized, and it is due to Captain De Krafft to state that he initiated this step, under the authority of Commodore English, the present able chief of the bureau of equipment.

The old forge-shop, and its sister, the equipment blacksmith-shop, were running day and night during the war, and the tall chimney of the forge-shop throwing out its bright flames at night, lighted up the country for miles around Washington.

In looking over the books of the equipment department, we find that some of its workmen now employed were at work here forty years

ago,—colored men, once slaves, and now grown old in the service of their country,—some of them having reached the age of sixty years, and are not to be surpassed as workmen.

The amount saved by the quality of the work turned out of the these shops is greater than one would at first suppose. In peace-times the parting of a chain-cable or the breaking of a shaft is of small moment; but when war is upon us all this is changed, and any faulty work may produce very grave results, hence the unanimous feeling among sailors in their preference for work done at navy-yards, where time is not an object and no one is to be enriched.

The largest piece of forging ever done in this shop was the shaft of the "Bonhomme Richard," in the year 1866; it weighed 57,000 pounds, its greatest thickness being 37 inches, with her crank 22 by 28 inches. It was only a short time ago that the 100-inch engine of this prospective man-of-war was taken down and broken up, the sudden termination of the war never having given us a hull. In 1860 the shaft of the U. S. S. "Roanoke" was forged, weighing 30,380 pounds, and in 1850 the U. S. S. "Susquehanna's" shaft was forged, weighing 34,000 pounds. These are only a few of the large forgings done here, many dating far back; and those mentioned are only given at random, to show what has been and can be done in this reliable old shop.

Mr. Wilson, the foreman of the forge-shop, has been working here for thirty-nine years, having served his time as an apprentice, when one of the present chiefs of bureaus was also serving his time. For the past nineteen years he has been forging, and it was under his superintendence that the "Bonhomme Richard's" shaft was forged, as well as all the forgings for her 100-inch engine. Of late little work has been done in the forge-shop, except an occasional connecting-rod for the engineer's department, and a few steel tubes for the 80-pounder breech-loading rifle,—contract work having been substituted. But the manufacture of chain-iron from old cables and the scrap-heap still goes on, and we are to-day producing very superior cables for the naval service, and at very small cost.

The first chain-cable manufactured by the navy that we have any record of, was made at the Washington navy-yard in the year 1829. It was marked No. 1,—size 1¼ inches, cast-iron studs,—90 fathoms long, and weighing 7927 pounds. It was manufactured for the old U. S. sailing-sloop "St. Mary's" of "Peru iron," supplied by contract. Up to August, 1868, there had been manufactured 828 cables, besides hundreds of anchors and small chains.

In the old days no steam-hammers were in use, and all heavy forgings were done with a hammer raised by hand and allowed to drop by its own weight; now there are six steam-hammers in use, the largest weighing 16,000 pounds.

In the preparation and treatment of chain-iron for the manufacture

of cables many processes are in use. After a long and careful series of experiments carried on by the United States Iron Board, of which Commander Beardsley was a member, the working of cable-iron as inaugurated by him was adopted at this yard.

The iron for the manufacture of chain comes from the scrap-heap, where is stowed the stock of old chain-cables received from the different navy-yards and vessels, also scrap-iron, the qualities of which are well known. These old cables when wanted are broken up into sections of suitable length to makes piles weighing about 130 pounds each. In forming the piles, they are placed on short pieces of boards for convenience in handling when put into the scrap-furnace. After being heated to a welding heat in the furnace, they are taken out and put under the steam-hammer, and hammered into blooms about six inches wide and three inches thick. The blooms are now cut into two pieces, the pieces placed one on the other, with the fag ends towards the "porter-bar," hammered together and cut off, put into the furnace again and reheated to a good welding heat; then taken out, welded and hammered into square billets according to the size of the iron required to be rolled, and cut off about 21 inches long, with the corners of the billets slightly rounded.

From experiments carried on lately, it has been found that a very fine quality of cable-iron can be produced if the area of the billet is twelve times that of the bar required; then for 2-inch cable-iron the billet would be 6 inches square and 21 inches long, when ready to be put into the rolling-mill for breaking down to the size wanted for the cable. A billet of greater area would produce a better bar, but the size of the furnaces and rolls, as well as the expense, are important considerations. The billets have now received all the working necessary, and when the chain-iron is wanted, are again put into the furnace and heated to a low welding heat, taken out, run through the rolling-mill, and rolled down to the size of the iron desired.

While the process of manufacture is going on the greatest care is taken to prevent any overheated billet from being rolled into bars; and throughout the hammering process one man is busily employed sweeping off any dirt that has or may accumulate on the bloom.

In this article the term "bloom" is used throughout the manufacture, and billet taking the place of "bloom," after the iron has received all its working and is ready to be heated for the last time to be rolled into bars.

The bars as they come from the rolling-mill are about 18 feet long, and while hot, men with wooden mallets see that each one is straight, when they are allowed to cool, and then laid aside for marking and testing.

Each bar is now carefully marked with paint by two numbers,—duplicates,—one number in the centre of the bar, and the other near one

end, from No. 1 upwards. The next step is to cut off the fag ends, or stub the bars, and at the same time cut one bolt from each bar, from the ends bearing the numbers; and from these bolts selected indiscriminately is taken the necessary percentage for testing in link form, also for bending tension, etc. The numbered piece cut off if found wanting in quality, by reference to its duplicate number the bar can be found and rejected for cable purposes.

It will be seen that the utmost care is taken to produce good iron, and by the testing of each bar for fibre it is hardly possible for an overheated or underworked billet to be made into cable. Of 1060 bars tested a few days since, only five bars in the whole lot were thrown out; and these were rejected on account of the granulous appearance of the iron at the fracture.

The bolt (12 diameters in length) taken from each bar is now put through the test required by the equipment department; and under the immediate supervision of the "Iron Board," at the head of which is the equipment officer of the navy-yard. In testing, all sizes below $1\frac{3}{16}$ inch must stand bending cold until the sides are in contact throughout, without signs of fracture on the outside of bend.

All sizes above and including $1\frac{3}{16}$ inch must stand bending cold until the sides are brought parallel (the distance between the sides not to exceed 2 diameters), without signs of fracture in the outside of bend. One per cent. of the whole lot of bars is taken for cold test.

For tensile strength, the mean of all sizes below $1\frac{3}{16}$ inch must be 55,000 pounds per square inch; should it fall to 53,000 pounds it would be rejected. All sizes above and including $1\frac{3}{16}$ inch, the mean tensile strength must be 54,000 pounds per square inch; any piece falling below 52,000 pounds, the bar would be rejected.

All sizes must stand bending at red heat until the sides are close together, without signs of fracture. In all sizes the area of the fractured section must not fall below 55 or exceed 70 per cent. of the original area; the elongation should be from 16 to 25 per cent.

The mean reduction of the strength of the bar by being in link form should not exceed 22 per cent., or 44 per cent. of the link.

The fag ends cut from each bar are now nicked with a sharp cold chisel, every one being broken by slight blows of a steam-hammer, and the fracture examined for fibre. Any granulous piece found, another piece is cut from the same bar, and broken in the same way; and should this second piece, when broken, be granulous, the bar is rejected for cable purposes.

Knowing how the iron is broken, we can form some idea of its texture; and here it might be well to remark the absurdity of an opinion given in the appearance of a fracture and not knowing how it occurred.

The next test is to pull 1 per cent. of the bolts, and the triplet specimens made from 3 per cent. of the whole lot of iron rolled. These

triplets contain three links with studs, and two end links without studs of $\frac{1}{8}$ inch larger iron.

The breaking strain of the bolts and triplet specimens is carefully recorded in a book kept for the purpose, and remarks on the appearance of the weld and fracture are also added. The most important consideration in the manufacture of chain-cables is to obtain iron that will weld, and at the same time retain the other necessary qualities required of iron in cable form. In iron rolled in the equipment rolling-mill, fibre is sought for, and granulous formation and high tensile strength avoided.

In testing the bolts for tensile strength, the very important factor of elastic limit comes in, and the first stretch of the bar is carefully noted and recorded.

Having rejected all the bars found deficient in any of the qualities enumerated, and having ascertained that the links weld well, the bars are now cut into cable-bolts by machine, their length depending on the size of the iron, every bolt being twelve times its own diameter in length. After cutting, the bolts are sent to the blacksmith-shop and the cable-making proceeded with.

The first operation in the blacksmith-shop is to bend the bolts. This is done at the link-furnace, where the bolts are heated to a light-red heat, taken out and put in the link-bending machine; when by pressure exerted at the end of a long lever they are made to take the shape of the letter U.

Formerly this operation was done by sledges, but in 1870, Mr. Richard M. Green, master-workman in the blacksmith-shop, invented the link-bending machine, for which he received ten thousand dollars from the government of the United States. After bending the bolt it is thrown aside to cool, and then examined for fire cracks in the bend; those containing cracks are thrown out.

All small chain-bolts from $\frac{3}{4}$ inch down to the least size in use are not heated, but bent cold.

The bolts, or cable-links, are now ready for the welders, and in welding the links the workmen are known and numbered as follows:

Up to and including $1\frac{1}{4}$-inch chain two men work together, one a chain-welder (skilled man) and the other a helper. For $1\frac{3}{8}$-inch and $1\frac{1}{2}$-inch, three men work together, one a chain-welder, and the two others helpers; $1\frac{5}{8}$-inch up to the largest cable, $2\frac{1}{4}$-inch, four men work together, one a chain-welder, two helpers, and one a chain-carrier.

In welding chain-cables four fathoms a day is a task, on whatever size cable the men may be at work.

Common as the process of welding now is, we are to-day unable to weld a cable and get the full strength of the bar in the link form. Commander Beardsley, in his interesting and valuable work on chain-iron and chain-cables, gives the results of many experiments, that "75

per cent. of the cable-links tested by him broke through the weld or at its quarters." If the weld be solid there is some danger that the bolt has been burnt in the welding process, and if imperfect it is liable to draw. Conclusions from one hundred and fifty experiments carried on lately, generally speaking, a weld with a slight imperfection in the throat is to be preferred to one that is solid. Though this small per cent. of imperfection is theoretically a defect, it cannot with our present knowledge be practically so considered, for a very large proportion of these welds which do not exhibit this defect (known as solid welds) either fail in tensile strength or exhibit a marked lack of uniformity when the tensile strength is sufficient.

The excess of heat needed to produce the solid weld often destroys the life of the metal at the weld, and very frequently at its quarters.

In welding, the ends of the link are first heated, scarfed, and then bent together; the link is then returned to the fire, when a white or welding heat is taken; then quickly withdrawn from the fire, placed on the anvil and welded, great care being given to the throat of the weld, where the imperfection so frequently occurs. Before the link cools the cast-iron stud is introduced, and the sides of the link hammered down close on the grooved ends.

There is great difference of opinion as to what, if any, benefit there is to the chain by the introduction of the stud. It has always been held, until lately, that the cable is thereby increased in strength. Luce, in his Seamanship, says the cable is strengthened one-fourth; while Beardsley, in his Iron Board Tests, says the studs weaken the chain. Other writers say the stud is introduced to prevent closing under great stress, and also kinking of the chain in handling. With 100 triplet samples made especially for the test, 40 of them without studs, 30 with cast-iron studs, and 30 with wrought-iron studs, these on being pulled to destruction stood as follows: wrought-iron studs first, cast-iron studs next, and those without studs last, with the cast-iron studs the most uniform. These sample triplets were made from iron rolled at the Washington navy-yard, and of the kind of bar-iron now used in the naval service.[1]

The links and swivels of a cable are welded one into the other until fifteen fathoms are manufactured; this length is called a stretch, or section.

It will be seen that the result of the welding process is to take from the strength of the bar; next to the weld the weakest place in the link is the quarters of the weld, and the frequency of the break at the weld or quarters would lead us to suppose it impossible to get a perfect

[1] The swivel of a cable is composed of three pieces,—bow, eye, and nut; the bow is last welded, and the next link through the bow is one-eighth of an inch larger than the chain; the link through the eye of the swivel being of the same size as the chain.

cable. If the long lap so much to be desired in the weld is obtained, a very great imperfection in the weld does not so much destroy the strength of the cable or link. I have seen a cable $1\frac{1}{4}$ inch in size pull to 103,000 pounds, and the link that broke had only 25 per cent. of the weld perfect, 75 per cent. not welded; and in the same cable with a perfect weld the link broke at 95,000 pounds, the fracture showing fibre, apparently an anomaly, but easily accounted for, as the imperfect weld had a long lap acting after the manner of sister-hooks.

Another example was a $1\frac{1}{8}$-inch cable which pulled 153,000 pounds, 3000 pounds below double proof, with 90 per cent. of the weld welded. In the same cable another sample pulled to 145,600 pounds, 10,400 pounds below double proof, though the weld was solid and the appearance of the fracture fibrous.

Mr. Richard M. Green, foreman of the blacksmith-shop, has been working with a chain-welder, an invention of his own; this machine is intended to weld the link by compression, and should it be successful a great stride in cable-making will have been made.

Cables now in use in our naval vessels are generally 120 fathoms in length, a few being 165 and 180 fathoms.

On the completion of the eight sections that compose a cable, it is taken to the testing-machine, when it is pulled 1 stretch, or 15 fathoms, at a time. The following table, though adopted as far back as 1849, is still in use for proof-strains for all cables issued to the naval service, the number of pounds strain to which a cable is subjected before issue being governed by its size:

TABLE FOR PROOF OF CABLES.

Size of Cable.	Pounds Strain Single Proof.	Double Proof for Triplets.
$2\frac{1}{4}$ inch	147,800	295,600
$2\frac{1}{8}$ "	134,400	268,800
2 "	117,600	235,200
$1\frac{7}{8}$ "	100,800	201,600
$1\frac{3}{4}$ "	87,800	175,600
$1\frac{5}{8}$ "	78,000	156,000
$1\frac{1}{2}$ "	66,600	133,200
$1\frac{3}{8}$ "	56,000	112,000
$1\frac{1}{4}$ "	44,800	89,600
$1\frac{1}{8}$ "	34,600	69,200
1 "	26,800	53,600

Chain-cables differing $\frac{1}{16}$ inch in size are not manufactured now.

The triplets are cut from the chain to be issued and are tested to destruction, but must stand the double proof before breaking.

Cables issued to the service are pulled to single proof only.

After the cable has stood the required test given in the proof-table, it is examined by an expert, to see if there are any defects in the welding. In pulling the stretches, each 15 fathoms will gain in length

about 15 inches; old cables pulled to destruction have increased their length 5 feet before breaking,—"Constellation's."

Triplets having been cut from every other section of the same cable, and at any part of the section as the equipment officer may select, they are pulled in the testing-machine and subjected to a breaking strain, to ascertain the ultimate strength of the cable. Great care is taken with the triplets, and the results being recorded, the history of the chain is now complete, and the whole data is recorded in the cable-book with the cable. The chain is now ready for the service, and is shackled up, coal-tarred, and stowed away for issue, after replacing the triplets cut from every other section. In shackling up the stretches, or sections, hickory pins are used to key the shackle-bolts.

Chains for the United States navy, of 120 fathoms in length, have swivels at $7\frac{1}{2}$, $37\frac{1}{2}$, and $82\frac{1}{2}$ fathoms, and shackles at 15, 30, 45, 60, 75, 90, and 105 fathoms.

It has always been an unsettled question as to where the first swivel should be placed in a chain-cable, many officers believing that it would be better to have it next to or near the shackle on the anchor. At $7\frac{1}{2}$ fathoms it not infrequently, in small vessels, comes on the ship's capstan, when a heavy heave is required in order to trip the anchor.

When chain-cables are 165 fathoms in length, the fourth swivel is introduced at $127\frac{1}{2}$ fathoms, and when 180 fathoms in length, the fifth swivel is at $172\frac{1}{2}$ fathoms.

In enumerating the different parts of a chain-cable, we commence with the jew's-harp (or ring) attached to the shank of the anchor; first comes the bending-shackle, next the club-link, and next two links, the second without a stud, and then the connecting-shackle, which connects with the end link of the cable (called connecting-link), which is also without a stud.

All the links without studs are one-eighth of an inch larger than the other links of the cable, and in a chain-cable of 120 fathoms in length, there are sixteen connecting links, two on each end of a length or section.

The belief in the service that the swivel is the weakest part of the cable was proven to the contrary by a few experiments carried on at the Washington navy-yard lately.

There are also manufactured for each cable of 120 fathoms ten connecting shackles, one-eighth of an inch larger than the chain. Eight of these shackles are used to connect the chain together, and two are spare shackles.

When a vessel carries four chain-cables, one extra club-link and bending-shackle complete is manufactured and supplied.

Chain-cables for the United States navy now have the following marks on them: each shackle is numbered across the eye from 1 to 8 inclusive (cable of 120 fathoms). The number of the chain is on each

swivel, the swivel also has marked on it the initials of the equipment officer manufacturing the chain, place of manufacture ("N. Y. W."), and the year. On the end links of each length or section are marked the initials of the welder or blacksmith, and the year. On the club-link are marked the number of the cable, the initials of the inspector (equipment officer), "N. Y. W." and year of manufacture. The bending-shackle on the club-link is nearly twice as large as the cable.

On the cast-iron stud is cast on one side "N. Y. W." (Navy-Yard, Washington), and on the other side "U. S."; there is also in small figures at one end of the stud the size of the cable, for example, "114" for a cable one and one-quarter inch in size.

By direction of the equipment bureau, all chain-cables are examined when a vessel returns from a cruise and turns in her chains. When the links have been reduced by wear or corrosion one-eighth of an inch in diameter, but otherwise in good condition, the section of the cable in which they are found is considered of that reduced size, and is so assigned to vessels and anchors. Should only a few of the links in a section be reduced more than one-eighth of an inch in size, they are taken out, replaced by new links of reduced size; but when a majority of the links are so reduced, the section is condemned. After this examination the cable is annealed, and the sections containing new links are tested in the proving-machine. Only one reduction in the size of a cable is allowed before it is condemned.

In April, 1875, the manufacture of chain-cables for the United States navy was commenced with iron rolled at the Washington navy-yard. The first cable was for the "Tennessee," Commander Beardsley superintending its manufacture. It was marked "No. 1," and the billets of which the bars were rolled were composed of alternate layers of old boiler-plates and condemned cable-bolts hammered together. Since this time nearly all of the chain-cables for the navy have been made of iron manufactured at the Washington navy-yard. Now all cables are manufactured from navy-made iron, rolled at the equipment rolling-mill, at from one-half to one-third the cost to the government were the iron supplied by contract, not to mention a superior quality of iron for cable purposes. The difference in the price or cost of manufacture of cables now compared to the cost of manufacture fifty years ago is very great, and very much in favor of the present mode of manufacture. In 1830 the total cost to the government for manufacturing a 1⅝-inch cable was $1634.05, now the same size cable costs $841.64 total. As it costs the government twenty cents more on a fathom for labor now than it did in 1830, the difference in cost is due to the fact of the equipment bureau working up their old cables on hand and rolling their own iron.

A Table Showing the Dimensions and Number of Links, etc., to make the following Chains:

Number of Fathoms in Cable.	Size of Cable.	Length of Links.	Number of Links in Fathom.	Total Number of Links in Cable.	Total Weight of Links in Cable.	End Links.			Shackles.		Number of Swivels in Cable.	Club-Links and Bending-Shackles in Cable.
						Size.	Number.	Weight.	Spare.	Connecting.		
Faths.	*In.*	*In.*	*No.*	*No.*	*Lbs.*	*In.*	*No.*	*Lbs.*	*No.*	*No.*	*No.*	*No.*
180	$2\frac{1}{4}$	27	$9\frac{1}{2}$	1710	51,727	$2\frac{3}{8}$	29	1024	2	12	5	1
120	$2\frac{1}{4}$	27	$9\frac{1}{2}$	1140	34,485	$2\frac{3}{8}$	19	671	2	8	3	1
120	$2\frac{1}{8}$	$25\frac{1}{2}$	$9\frac{1}{2}$	1140	28,853	$2\frac{1}{4}$	19	575	2	8	3	1
120	2	24	10	1200	25,500	$2\frac{1}{8}$	19		2	8	3	1
180	$1\frac{7}{8}$	$22\frac{1}{2}$	11	1980	34,432	2	29	616	2	12	5	1
120	$1\frac{7}{8}$	$22\frac{1}{2}$	11	1320	22,955	2	19	404	2	8	3	1
120	$1\frac{3}{4}$	21	$11\frac{1}{2}$	1380	19,513	$1\frac{7}{8}$	19	330	2	8	3	1
180	$1\frac{5}{8}$	$19\frac{1}{2}$	13	2340	26,676	$1\frac{3}{4}$	29	410	2	12	5	1
120	$1\frac{5}{8}$	$19\frac{1}{2}$	13	1560	17,784	$1\frac{3}{4}$	19	269	2	8	3	1
120	$1\frac{1}{2}$	18	$13\frac{1}{2}$	1620	14,418	$1\frac{5}{8}$	19	216	2	8	3	1
120	$1\frac{3}{8}$	$16\frac{1}{2}$	15	1800	12,348	$1\frac{1}{2}$	19	169	2	8	3	1
120	$1\frac{1}{4}$	15	16	1920	9,888	$1\frac{3}{8}$	19	130	2	8	3	1
120	$1\frac{1}{8}$	$13\frac{1}{2}$	18	2160	8,122	$1\frac{1}{4}$	19	98	2	8	3	1
120	1	12	19	2280	6,019	$1\frac{1}{8}$	19	71	2	8	3	1

ANCHORS.

Anchors for the United States navy have undergone but little change since the first large iron-stocked anchor was introduced at the commencement of the war; the smaller anchors had long before this time been iron-stocked, and it is only during the past few years that the wooden-stocked anchor has entirely disappeared.

The forging of anchors was carried on at the Washington navy-yard some time before chain-cable-making was inaugurated, and, with few exceptions, all the anchors now in use in the naval service were made here.

Anchors are now forged from scrap-iron in five parts, viz., the shank, two arms, stock, and shackle. The scrap-iron is first hammered into blooms, the most convenient size for use being about 36 inches long, 10 inches wide, and 4 inches thick.

The blooms being in readiness, the different parts of the anchor are forged, and the anchor put together in the following order:

The shank.—The blooms are piled on the end of a "porter-bar" heated and welded under a steam-hammer until the mass of iron on the end of the bar is of sufficient size to make the shank. The building-up process commences at the crown end of the shank, and the mass is gradually drawn out towards the shackle end and swaged smooth under the steam-hammer. The shackle end of the shank is then heated and shaped up, the hole punched for the stock and shackle (or jew's-harp)

bolt, when the shank is cut off at the crown, next to the porter-bar, and laid aside.

The two arms.—The arms are made separate, and are built up and hammered out under the steam-hammer in the same manner as the shank. After punching the hole for the rivet, which goes through the arm and palm, the arm is cut off and laid aside, the other arm being forged in the same way.

The two palms.—The palms are next forged, and also laid aside. A welding heat is now gotten on one of the arms and one palm, and the palm is welded to the arm, after which the rivet-hole is punched through the palm and the rivet put in; the pee, or bill, of the anchor is now drawn out and finished up, the other palm and arm being worked in the same way. The shank is now taken up again and heated at the crown end, scarfed on one side and the first arm welded on; then scarfed on the other side and the second arm welded on, the scarfs being on opposite faces, after which the arms are shaped up rough. The arms having been forged out and welded on straight are now heated, and by means of a turnbuckle, or screw, bent to their proper shape. The stock is forged from blooms in the same way as the shank, and a cast-iron ball is riveted on the straight end, the bent end having a movable ball and key. The shackle, jew's-harp, or ring, comes last, it being forged straight, and afterwards bent to its proper shape and a bolt fitted to the eyes.

The common navy anchor is proportioned as follows: having determined on the length of the shank, which is for a $2\frac{3}{4}$-ton anchor 13 feet 10 inches, the stock from its bend to the ball at the other end is the length of the shank over all. The length of the arms from pee to crotch is nearly one-third the length of the shank, and in bending them an equilateral triangle is formed, with the distance from the pee to the crotch for one side, this distance laid off on the shank from the same point of the crotch for another, the distance from the end of this line on the shank measured to the pee completing the triangle. The ring, or jew's-harp, is in diameter about two-thirds the diameter of the stock, and is in length, before bending, from eye to eye about twelve times its diameter. Anchors are marked as follows: on the side near the crown is marked the anchor's weight in pounds, underneath this the year of manufacture, then "U. S." and (place of manufacture) "N. Y. W.," and last the number. Between the hole for the ring, or jew's-harp bolt, and the hole for the anchor-stock the inspector's (equipment officer) initials are cut, and on the stock just below its shoulder is marked its weight in pounds.

The latest improvement in anchors now manufactured at the Washington navy-yard is the anchor of Commodore Febiger, the commandant of the yard. In this anchor the palms are extended all the way down the arms and uniting in one at the crown. This form of anchor

makes it impossible for a cable to hook underneath the palm and around the arm when the anchor is let go, and it thus avoids the too common foul anchor. The stock is flat, and of iron, and is bent towards the ring of the anchor; it being very wide adds to the anchor's holding powers. This form of stock is also not so liable to foul as the present bent-iron stock. The facility of stowage of the bent-iron stock is sacrificed, but this advantage is not apparent with bower-anchors. The cost of the Febiger anchor is a little more than the common navy anchor, but in these days of cast steel and cast iron it might be possible to get this anchor up at little expense to supply the merchant marine, if not the navy. In fishing the Febiger anchor, an iron band is bolted on to the shank just above the arms for the purpose; it has two ring-bolts, into either one of which is hooked the fish, as most convenient.

Of the patent anchors now in general use, Martin's English anchor is far ahead; most of the large English ironclads some time since were equipped with this anchor, but for no apparent reason has it ever been very popular in our service. The Martin anchor is very much lighter than the old style of navy anchor, easily stowed on the bows of a vessel, and is not liable in a collision to foul and hook into the rigging of another ship. It is without stock, but has steadying arms, and there is very little danger of a ship knocking a hole in her bottom by grounding on this anchor. One of the great advantages claimed for the Martin anchor is, that it is not welded, and is formed of three distinct pieces of wrought iron. Stowage and less liability to foul another vessel are its great advantages, these being at a maximum for ram vessels.

Mr. Joseph L. Williams, of Philadelphia, has invented an anchor with stock or steadying arms, and it is now being tried on the U. S. S. "Quinnebaug," where it has been favorably reported upon. This anchor possesses the great advantage of not being easily fouled, and its holding powers should be the same as Martin's, both of which being nearly double that of the common anchor on once taking the ground.

The ideas of inventors would now all seem to tend in one direction in anchor-making; and this is to obtain more holding power with the same weight of metal. In both Martin's and Williams's anchors, the two flukes take the ground together.

The bower- and sheet-anchors for the United States navy weigh nearly the same, the weight of an anchor being inclusive of the bending-shackle, and exclusive of the stock, which is very nearly one-third the weight of the anchor to which it belongs with anchors up to 250 pounds weight, and one-fourth with anchors from 250 pounds to 6000 pounds weight. Anchors for the navy are not tested now, nor are they annealed, but sent into the service as they come from the forge-shop. Though the practice of annealing anchors has been discontinued, it is a question open for discussion if old anchors cannot be much improved by this process, which has been tried on old cables with much success.

New anchors are placed on the fire, after being forged, and heated to a red heat, then hammered by hand with sledges until their surface is comparatively smooth and the red heat disappears, when as many men as can gather around do so, and, with hand-hammers, finish up by giving the anchor a cold "batter."

C. T. HUTCHINS,
Lieutenant U. S. Navy.

WASHINGTON NAVY-YARD,
April 23, 1880.

THE FIRST HOME-COMING OF THE RESERVES.

A PENNSYLVANIA VOLUNTEER SKETCH.

THE Pennsylvania Reserves owed their origin as an organization to a conjunction of circumstances that occurred in the spring of the first year of the war. The call to arms in the early days of that year met no readier response than from the citizens of the Keystone State. Her metropolis dispatched to the national capital the first body of men that arrived there for its defense, and every mountain hamlet and valley town throughout her length and breadth was resonant with the hum of preparation for the coming conflict. Of the seventy-five thousand men first called for by the general government, her assigned quota was fourteen regiments; these were promptly furnished, and such was the ardor of her people that the services of about thirty more regiments had to be refused by the State authorities.

The men composing these rejected regiments felt bitterly the disappointment of the high hopes with which they had rallied to the succor of the government, but it did not quench their patriotism nor dispel the conviction that their services, now refused, would yet be needed. Indeed, this juster estimate of the magnitude of the impending struggle that possessed the minds of the people, as contrasted with the disposition to belittle it which was shown by many officials, civil and military, was a marked feature of the period. To it was due the fortunate fact that although their services were declined, the officers and men who found themselves for the time superfluous did not disband their organizations nor intermit their drills and military exercises. And so it came about that when the distinguished son of Pennsylvania to whom had been confided the defense of the Upper Potomac, and of the lines of communication of Washington with the North, called upon the governor of the Commonwealth for twenty-five additional regiments of infantry and one of cavalry, His Excellency found it practicable to respond with great alacrity, and a large part of this force was in readiness for service when again the chilling blast of governmental hesitancy repelled the blossoming of Pennsylvania patriotism. The Federal

authorities gave out that they wanted no more troops, and that too many had already been accepted.

Here, then, arose the conjunction of circumstances to which the origin of the Reserves was due. Pennsylvania was, with respect to the war then already begun, a border State, liable to be invaded, and certain, in case of disaster to the Federal arms, to be the first State looked to for aid. Her citizens by thousands were pressing for acceptance of their services. Her governor was ready and anxious to accept, but compelled to decline these services by reason of the refusal of the general government to muster in any more troops. The action taken by the governor at this juncture was broad and statesmanlike. He convened by proclamation a special session of the Legislature, and recommended to it the organization of a force primarily for State defense, contingently for muster into the Federal service, to consist of thirteen regiments of infantry, one of cavalry, and one of artillery. To this recommendation of the governor the Legislature promptly responded, and on the 15th of May, 1861, passed the act under which was organized the Pennsylvania Volunteer Reserve Corps.

Thus came into being that famous body of troops which, by reason of the care given to the selection of its men, its greater mass and volume as compared with other volunteer organizations, its completeness as comprehending the three arms of service, its high tone, and the *esprit de corps* naturally resulting from the circumstances of its origin, was from the very outset a marked organization. Numbering in its ranks men from every county, almost from every township, in the State, it was more representative of the people, and centred the hopes and interests of more communities and families, than any one organization in the Federal army.

The first service rendered by the Reserves was by a detachment sent to the assistance of General McClellan, in West Virginia, commanded by that accomplished soldier and gentleman, Colonel Charles J. Biddle, of Philadelphia. Then came the panic resulting from the Federal repulse at Bull Run, on the 21st of July, 1861, and the authorities at Washington, who had so cavalierly refused Pennsylvania's repeated offers of more troops, found much comfort in the fact that her governor and people had forecast the future and were ready to forward an army to their succor. All but two of the Reserve regiments were hurried to the capital, and their arrival lifted a load of anxiety from the hearts of all who wished her well. Their presence assured what before was problematical, namely, the safety of the seat of government from capture by the Confederate forces. The other two regiments were sent to General Banks, at Maryland Heights, opposite Harper's Ferry, where a column of three years' troops was being formed to replace General Patterson's force, whose three months' term of service was about expiring. Subsequently, the whole corps was concentrated at Tennally-

town, a short distance north of Washington, and while there was divided into three brigades, commanded respectively by Generals Reynolds, Meade, and Ord, the whole constituting a division of the Army of the Potomac, under command of Major-General George A. McCall, a distinguished ex-officer of the regular army, to whom Governor Curtin had confided the original organization of the Reserves. While it lay at Tennallytown the governor visited the division, and presented to the regiments the colors which had been prepared for them by the Society of the Cincinnati, of the State of Pennsylvania. The occasion evoked much enthusiasm, and of the standards then intrusted to the division not one was ever lost, though all were borne in the thickest of the fight on a score of battle-fields. Riddled by bullets and ribboned by winds, they were returned to the State, and now repose in the Capitol at Harrisburg, mute yet eloquent witnesses of the trials and triumphs of Pennsylvania valor.

On the night of the 8th of October, 1861, the Reserves crossed the chain-bridge into Virginia, and, marching some four miles beyond the Potomac, formed Camp Pierpoint, in front of the village of Langley, on the Leesburg Turnpike. Again, as previously on their arrival at Washington, it fell to them to give heart and hope to the country, distraught and humbled by such affairs as those of Big Bethel and Ball's Bluff. Around the whole horizon of the theatre of war disaster and defeat lowered upon the Federal arms, when one morning in December, 1861, the Third Brigade of the Reserves, commanded by the rough and ready Ord, left their camps and marched out to Dranesville, a hamlet some fifteen miles in front of the Reserves' position at Camp Pierpoint, to look after General J. E. B. Stuart, the crack cavalry commander of the Confederates, who was reported to be in that neighborhood. Stuart seemed as willing to be found as was Ord to find him, and encountering each other in the immediate vicinity of Dranesville, the two generals wasted no time in preliminaries, but fell to work with promptitude and vigor. All the conditions were favorable to a lively fight. The forces were very evenly matched, the air was cool and bracing, and both sides were eager for the fray. The battle was stoutly contested, and for a time victory seemed as likely to crown the one as the other of the opposing lines. It perched at last, however, on the standards of the Reserves, and the report of their success rang through the North like the pibroch of a Highland clan returning exultant from a foray.

Hastening to bring this sketch to the time of the event that gives it title, I must dismiss with mention merely the battle of Mechanicsville, where first the Reserve division as a whole received its baptism of fire; the battle of Gaines' Mills; Charles City Cross-Roads, where it bore the brunt of the Confederates' desperate attempt to cut in two the long column of the Army of the Potomac, marching to its new base on the James; Malvern Hill, where the grand army stood at bay and hurled

back its foe terribly punished; the second Bull Run, South Mountain, Antietam, and Fredericksburg, in all of which it bore conspicuous part.

Its losses in these fierce engagements had been very large. Unless my recollection is at fault, the loss of the Reserves during the seven days' fighting in front of Richmond was greater than that of any corps engaged in those battles, excepting only the Fifth Corps, to which the Reserve division belonged, and in whose aggregate of loss that of the Reserves was of course included. Again, at Fredericksburg it was selected as the division to lead the attack on the right of the Confederates' line, and on that bloody field it lost more than one-half its effective strength. Many of its officers and enlisted men were absent by reason of wounds or capture, and it had become a mere skeleton of its former array. At this period of the war it was very difficult to get recruits for the regiments at the front. This was not so much the consequence of waning ardor on the part of the citizens of the Northern States, as because most of the young men were members of military organizations with which they were willing to go to the war, but which they were not willing to abandon for the sake of filling up the depleted ranks of the regiments in the field. This is a vice of the volunteer system. It probably always will be sufficiently easy to procure volunteer *organizations* at the outbreak of a war, but when these have been reduced below an effective strength by the casualties of service it is not easy, if, indeed, it be possible, to get enough individual volunteers to refill the ranks. And yet the latter are what is needed. Two new regiments composed of men inexperienced and unseasoned are not as valuable as a single old one with its vacant places filled up by fresh men, who, by contact with their veteran comrades, soon take on their qualities.

After the battle of Fredericksburg, and the abortive movement known as the "mud march," there seemed to be a lull in the storm of battle, and Governor Curtin and other friends of the Reserves made an attempt to get them withdrawn from the front for a time and returned to the State to recuperate and refit. It was thought that, although recruits enough to fill the ranks of the division could not be got to join it at the front, if it could be for a time returned to the State its high renown would create an enthusiasm that would speedily fill its gaps. This attempt was but partially successful. A sort of compromise was effected, by which the division was transferred from the Army of the Potomac to the Department of Washington. The officers and enlisted men hailed the intelligence of their transfer with fond anticipations of enjoying a season of comparative exemption from the toils and trials of active service, and looked forward to the time when, with its ranks refilled, the division should again take the field "conquering and to conquer." But much of this turned out an illusion. The service in their new field of duty proved more onerous than that from which they

had been transferred. They were stationed on the exterior line of the department, practically as far from the attractions of the capital as they had been on the Rappahannock, and to this day the "true inwardness" of having to march nine miles from their camps to do picket duty in front of certain Vermont troops who had never fired a gun in action has failed to penetrate the sensorium of the most gifted of them.

While the division was thus stationed many of the officers and enlisted men who had been absent on account of wounds received in the actions before Richmond returned, and a few recruits were obtained. The disappointment of the hopes that had been prompted by the first intelligence of their transfer had been transitory, and the spirit of the division was as high as ever, when suddenly it was raised to fever-heat by the rumor that General Lee had determined to invade Pennsylvania.

Following close upon this rumor came the vanguard of the Army of the Potomac marching past the camps of the Reserves, *en route* for that as yet undetermined battle-field, which afterwards, taking its name from the quiet Pennsylvania village near which it was fought, came to be known as Gettysburg. The dusty marchers from the Rappahannock, debouching from the cedar thickets upon the camps of the Reserves, and noting the clean arms, accoutrements, and clothing to which the latter had attained, and, above all, the white gloves which they sported, took them for "home guards," or, at best, new troops as yet apprentices to the stern trade of war. But their chaffing turned to hearty and respectful recognition when they found that the supposed greenhorns were their old comrades in half a score of fights.

To "stand like greyhounds in the slips, straining upon the start" when such royal game was afoot, was gall and wormwood to the Reserves. To be inactive spectators of the great events that were evidently impending, and of which their mother State was to be the theatre, was very trying, and the thought that the homes whose defense was one of the objects of their organization were to be threatened was wellnigh unendurable. They petitioned their commanding officers to procure orders for them to join again the Army of the Potomac. Meanwhile, two of their former commanders were urgently asking for the assignment of the Reserves to their respective commands. Both General Reynolds, then commanding the First Corps, and General Meade, commanding the Fifth, were well acquainted with the quality of the Reserves. They were both graduates of the division, each having begun his career in the war as a brigade commander of the Reserves, and each was trying with earnestness to appropriate their services. General Meade was the successful suitor, and on the 25th of June orders were received for two brigades of the division to proceed at once to join the Fifth Corps; the remaining brigade was retained in the Department of Washington. Late in the afternoon of the 25th the bugles sounded

the "assembly," and a few minutes later the Reserves were on the march with their faces turned towards the homes they had gone out from two years before. At Frederick, in Maryland, where they arrived on Sunday, the 27th, they joined again their old comrades of the Army of the Potomac, and learned with mixed feelings of pride and disappointment that General Meade had been transferred from the command of the Fifth Corps to that of the army.

In the second or third year of their term of service there is not, ordinarily, much of sentiment stirring in the breasts of the rank and file. Under our volunteer system men may have taken up arms at the beginning of a war impelled by motives of the sentimental sort. Patriotism, romance, love of adventure, woman's behest, or woman's scorn, —these all have played their part in sending men to battle. But the hard realities of service, the toilsome march, the comfortless bivouac, the monotonous routine, and the rigid discipline do in time pretty generally lop off the sentimental and ingraft the practical. The average soldier, after the first flush of excitement and novelty has passed off, trudges wearily along, thinking more of the weight of his knapsack or musket than he does of his country. He may occasionally give a thought to the girl he left behind him, but if it dare to linger it is, more likely than not, pushed out by a beatific vision of fried hard-tack and molasses. The circumstances of the Reserves, however, at this period were exceptional. They were coming home. And this coming home was not as they had fancied it when they were going out. Many of them remembered the return of the volunteers from Mexico, and they recalled the civic and military honors with which the returning heroes were received. Arches of evergreens over the streets, garlands and wreaths of flowers, salutes of cannon and the strains of martial music, speeches of welcome, collations and acclamations,—these were the visions of the volunteer as he pictured himself returning triumphant from the war. These young fellows were coming home, but how differently from what they had fancied would be the way! The enemy they had gone forth to fight was not yet vanquished; they were not yet to lay off the harness of war and wash themselves clean of the dust and grime of the conflict. Their greeting was like to be warm indeed, but the shouts would be the foeman's yell, not the cheer of friends; the cannon would be shotted and discharged with deadly intent; and the parade and panoply would be of war, not of a civic celebration. It is not hard to realize that to these Pennsylvanians this Northward march had a significance that had never attached to their movements to and fro, like the pieces on a chess-board, to which they had become accustomed in Virginia.

And now on the night of the 30th of June, as they rolled themselves in their blankets after a hard day's march, their last waking thought was that on the morrow they would cross the line and tread

once more their native soil. Briskly, when morning came, they responded to the reveille and took up the march. The day was a beautiful one. Blue skies, flecked with fleecy clouds, smiled down on fields freshened by recent showers; bees droned lazily through the air; cattle stood picturesquely under trees or industriously cropped the clover; and all sights and sounds betokened peace. As mile after mile of Maryland was left behind, the "line" became more and more the principal topic of thought and conversation. That line was a noted one. When, in 1763, Charles Mason and Jeremiah Dixon commenced the running of it they were already distinguished in their profession, and had elsewhere done good work, and yet the locating of that line, and the linking of their names with it, was to make those names familiar for long years afterwards to the people of the United States. Down to the opening of the war a political speech could scarcely be uttered in legislative halls or on the stump in which Mason and Dixon's line did not figure prominently. It was in a double sense the boundary between States, not alone States as political divisions of territory, but states of existence as well, for on its one side was freedom, on its other servitude. It had now acquired another title to distinction. The passage across it of the Southern army marked a new era in the prosecution of the war. Before that event the war had been, on the part of the Confederates, defensive in its character; its theatre of operations had been confined to the territory of the seceded, or, at least, of slave, States, and now for the first time their forces had set foot upon the soil of the free North. Great consequences impended on this invasion. If it should be successful all the immense resources of Pennsylvania would become the spoil of the invader, and if it should not result in General Lee dictating the terms of peace at Philadelphia, it could not fail to set the Southern cause on a firm foundation, in both a moral and material way. If, on the other hand, this invasion should be repulsed, then indeed would this line have proved Lee's Rubicon, and his crossing it the fatal overleap of vaulting ambition.

The more thoughtful and intelligent of the Reserves pondered these things as they plodded along, and all of them were on the alert for some indication of that line towards which they were steadily progressing. About three o'clock in the afternoon the welcome signal for a halt was sounded. After a brief rest the ranks were formed again, and, the division being massed in column, an order of the general commanding was read to the troops, reciting in appropriate and inspiriting language the fact of the invasion of Pennsylvania by the Confederate forces. Then the old flags, which up to that time had been carried enveloped in their oil-cloth covers, were tenderly unfurled, "Forward!" was given, and the column moved gayly and swiftly on. Of a sudden abreast with the head of the column appeared an ancient, white-haired man, bareheaded, his snowy locks streaming in the wind, like the white

plume of Henry of Navarre, eagerly intent on pointing out to the enthusiastic soldiers the exact location of the *line*. Who he was or whence he came I never knew. He might, for aught that appeared to the contrary, have been the materialized spirit of one of the ancient surveyors, granted leave for the nonce to revisit the scene of his former labors and to locate the line anew for our especial behoof. He was at all events a worthy *genius loci*. Cheer after cheer rang out as the Reserves pressed once more their native soil, and when a few minutes later they were turned off the road into a beautiful grove carpeted with a velvety sward, it seemed as if their mother State had swept and garnished her broad lap to receive them. Thus they crossed the line, but not yet had they done with inspiring incident. Rollicking on the green bosom of their sylvan bivouac, one of them observed, shining through the foliage overhead, despite the full blaze of the sun, a radiant star. Soon every eye was directed heavenward, and for a few minutes all gazed in solemn quiet at the beautiful visitant. Then through the scattered groups of soldiers a joyous murmur ran, for in this celestial apparition they thought that they beheld an omen presaging victory. They gave no loud demonstration of delight over this incident, but it seemed to bear in upon the hearts of all of them a calm, abiding assurance that this home-coming of theirs would not be fruitless of good results. They did not at that time know that their gallant comrades of the First and Eleventh Corps had already met the initial shock of the great battle, and that Reynolds, their old commander, was dead. Had they known, their deep joy would have been veiled in deeper sorrow, for Reynolds was the idol of the Reserves. The enlisted men of his old brigade were on this very march carrying with them a costly sword, which they had procured for the purpose of testifying, by its presentation to him, their love and admiration. It had been in their possession for some time, but their detachment from the Army of the Potomac before it reached them had prevented their presentation of it, and when this Northward march began they had hoped that opportunity would occur to place it in the hand of the great soldier for whom it was intended. Alas! that hope was never to be realized. The good right hand that was to have grasped that jeweled hilt was nerveless now, and the soldier's heart that would have glowed with honest pride to receive such a testimonial was still. An hour or so later, their march having been resumed, tidings began to reach them of the battle that had been fought and of the dire bereavement which they and the country had sustained. A gloom settled down upon the hearts that the star had gladdened like that which a thunder-cloud brings over sun-lighted fields, and a stern resolve to avenge the knightly leader they had so often followed went with them through the darkness. At two o'clock in the morning they halted and slept for one hour, and then took up again the forced march they were making, and about noon

their goal was gained, and they stood upon the battle-field of Gettysburg.

Their first position was in reserve, in rear of the right flank of the Federal line. The Confederates, having failed the day before to push their repulse of the First and Eleventh Corps sufficiently far to enable them to plant themselves on Cemetery Ridge, had been compelled to take up with the less elevated and weaker position afforded by the heights known as Seminary Ridge. The Federal subdivisions had arrived rapidly, and now their bayonets and batteries crowned the crest from its eastern extremity on Rock Creek, around its northward bulge, and along its southward stretch to near where the two Round Tops knobbed its other end. A slack cannonading and the intermitting crack of sharpshooters' rifles were the only sounds that gave token of the presence of hostile forces. The grand blow that Longstreet was preparing, and which was later to make the intervale of the opposing ridges seethe and scorch like a devil's caldron, was not yet launched. Right welcome to the foot-sore Reserves was the respite afforded them, and from their grassy lounging-place they watched the cannoneers upon the crest of the ridge in front of them as they rammed home the charges of their guns or discharged them sullenly at the foe. Now and again a gunner would fall pierced by the bullet of a rebel rifleman. Cooper's battery, belonging to the artillery of the Reserves, was engaged just above them, and some of the officers of the division proposed to go up and visit their artillery comrades. Taylor, the young colonel of the "Bucktails," was asked to go with them. "No," he replied; "my place is with my men; and if I fall to-day, I will fall in my place." A few hours later, in the hurly-burly of the rush down Little Round Top and across the plain at its foot, Taylor did fall—dead.

The transfer of the Reserves from the right to the left flank of the Federal lines was consistent with the distinguished fortune that had always placed them at the point of greatest danger, for as the day wore on it became apparent that the left rather than the right was to be the point of attack. And about three o'clock in the afternoon the shock came. The left of the Federal line was held by the Third Corps, which through a misapprehension of his orders by its commander had been projected in front of the general line, so that there was formed on this flank a salient angle, its right side extending from the general line out to a peach-orchard called "Sherfy's," and its left side reaching back towards Cemetery Ridge, near Little Round Top. On this left side of the angle made by the Third Corps the attack fell. The greater development of the Confederate line enabled it not only to cover the whole of this left front of the Third Corps, but also to thrust its right flank into the ravine between the two Round Tops. These knobs once in their possession, the Confederates would hold the key to the entire position of the Federals and be enabled to take the latter in reverse.

The Round Tops therefore became points of supreme importance. Owing in part to the misplacement of the Third Corps, and in part to a seeming misapprehension of their relation to the general position, these knobs were up to this moment wholly unoccupied by a Federal force. Fortunately, the Fifth Corps, of which it will be remembered the Reserves formed part, were now near enough at hand to make possible, by rapid and energetic movement, the opposing of a brigade or two to the almost consummated attempt of the Confederates upon Little Round Top. These checked the onset of the Confederates, and being reinforced, repulsed for the time their determined assault. But the Federal success was temporary. With fresh accessions of strength the enemy pressed forward, sweeping from before them every vestige of resistance to their seizure of the coveted "coigne of vantage." The sun was rapidly declining, and it seemed as if its last rays falling on Little Round Top would be reflected from the bayonets of victorious Confederates. And now the Reserves appeared upon the scene. While one of their two brigades hastened on to occupy and hold the Greater Round Top, the other, reinforced by one regiment of the former, faced to the front and commenced a furious firing at short range upon the now halted enemy. No human resistance could long oppose itself to so withering a fire. Breaking, now here, now there, soon the Confederate lines resolved themselves into a disordered mass of fugitives. Then as they dashed down the slope in pursuit the Reserves raised a cheer so mighty that even the townspeople of Gettysburg, two miles away, heard and recognized it, and welcomed it as the only hopeful sign that the fight had so far given forth. The Reserves pushed their pursuit of the flying foe across the plain, over the stone wall that bounded it, and across the wheat-field beyond until the woods received and sheltered their discomfited enemy. Behind the stone wall, to which they had returned from the pursuit, they found a resting-place for the night.

The reveille that roused the slumbrous warriors on the morning of the 3d was the crack of rebel rifles and the "zip" of minié-balls. The sharpshooters of the enemy, posted in trees, waited only for sufficient light to enable them to descry the recumbent forms of the Reserves scattered over the plain to renew hostilities. What a moment before had been a scene of repose became instantaneously one of lively movement. The rudely-awakened sleepers, hastily gathering their arms, blankets, and accoutrements, went scurrying forward to the cover of the wall. Over on the right of the Federal lines heavy work was being done by the gallant Twelfth Corps in driving the rebels back from the advanced lodgment they had gained the day before; but on our flank such battle as was waging was mainly between the pickets of the two armies. Although the Reserves were partially protected by the stony rampart behind which they lay, there was a constant dropping of bullets

against and inside of the wall, and the unwary exposure of a head or an arm was apt to result in death or wounds.

The irrepressible Bucktails, the wild mountaineers of Western Pennsylvania, whose life-long experience with the rifle had made them peerless as sharpshooters, could with difficulty brook the restraint that held them passive under a state of things which appealed so strongly to their *amour propre*. They already had their due contingent on the picket-line, but they all itched to be there. Squads of them would come to the brigade commander and beg him to let them "go gunning for a reb." The permission obtained, they would skip over the stone wall as lightly as the red deer of their native wilds, and, with the mingled caution and courage of veteran hunters, would pass outside the line of pickets, creep close to the opposing line, and watch their opportunity to bring down their game. Two of them caught a rebel snugly bestowed among the upper branches of a tree, whence he had for hours been picking off our men, whose rampart his eyrie overlooked; seeing that he was discovered, he dropped his rifle and exclaimed, "Don't shoot; I'll come down!" "We know you will come down," replied the Bucktails, with an irony that was lost to its object by reason of the fatal rifle-crack that went with it. Incidents like these, important enough to individuals, but of small account as affecting the general result, marked the earlier hours of that 3d of July, 1863, which was to be made memorable by the occurrence a little later of one of the most terrific artillery duels which ever shook the earth with its thunders. I shall not attempt to describe it. The imagination which can conceive of hell's demons suddenly set free and coursing through the air with howls and screams and piercing yells, may somewhat nearly realize the nerve-trying discord produced by the storm of deadly missiles that broke over the field of Gettysburg a little after noon. This tremendous cannonading was the prelude to the last desperate effort of the Confederates to wrest victory from the jaws of defeat. The attempt, though gallantly made, failed, and the shattered columns of Lee's veterans were hurled back to advance no more on Pennsylvania soil against its brave defenders. The great battle of Gettysburg was substantially over. It fittingly remained, however, for the Reserves to give emphasis to the parting, and to

"Close the drama with the day."

At a late hour of the afternoon they dressed their lines as if for parade, under a hail of grape from the rebel guns, and, springing over the stone wall, advanced towards the wooded crest which formed the lair of their sullen foe; nearing it, they rushed forward with battle-cry and bayonets fixed, carrying havoc and dismay into the very midst of the demoralized rebel host. By well-conceived and rapidly-executed

manœuvres the gallant commander of the Reserves presented front to each new force of the enemy that approached him, come from what direction it might, and succeeded not only in repulsing all attempts at resistance, but in capturing a large number of prisoners and arms.

So ended this home-coming of the Reserves. Lee, drawing in his lines and intrenching his position, still lingered on the scene of his great defeat, but only to collect his wounded and his stores and set in motion towards the Potomac that saddest of all processions,—the train of a vanquished army. On the morning of the 5th the Reserves filed out from the advanced position they had so gloriously won to join the flanking pursuit of the rebels which Meade had ordered. As they marched back towards the Round Tops, over ground every foot of which they had wrested from rebel foemen, they might well be pardoned a feeling of exultation and pride. The haughty host which had dared to invade the soil of their mother State had been hurled back humbled and broken, and the part which they had played in accomplishing this result was no mean one. As a typical Pennsylvania organization they had done no discredit to the State whose name they bore, and they turned their faces once more to the South, rejoicing that they had been permitted to assist in defending the homes which were so dear to them.

The Reserves had another and a final home-coming, but it was after the Wilderness, Spottsylvania, and Bethesda Church had still further thinned the ranks in which Gettysburg had made so many gaps. Their reception on this last return was as full of "pomp and circumstance" as their most florid imaginings had ever pictured it when it was yet a thing to be dreamed of in the distant future. But it is of their first home-coming that the Pennsylvania sire who fought with the Reserves at Gettysburg will tell his children as they gather round him in the gloaming to hear his stories of the war.

OLD RESERVE.

THE UNITED STATES REVENUE MARINE.

WHILE the army, navy, and marine corps, from the earliest foundation of each branch of the service, have not lacked talent, enterprise, and the will to register and perpetuate their deeds of valor, shedding a halo of glory around the national colors, the revenue marine, or as it was once denominated, the revenue cutter service, has yet to boast of a historian.

That such should be the case with this particular branch of the government is a cause of deep regret, and many a gallant action has been suffered to languish and fade in the mists of obscurity, until lost amid the accumulations of years.

Dating the birth of its honorable career from March 21, 1791, with a fleet of ten vessels specially built, armed, and equipped by act of Congress, and officered by men who had fought side by side with the naval heroes of the Revolution, contributing in no small degree by their individual skill and bravery to the success attained by that particular arm of the government, it is astonishing, to say the least, that its record should have been so long ignored and overlooked, while the prowess of our navy has been heralded to the world, not omitting the slightest detail.

Fenimore Cooper, with his great genius and versatile pen, in his Naval History alludes but casually to the fleet of armed revenue cutters, and, referring to Captain McNiel, who was dropped from the list owing to a reduction of the service, says, "He afterwards commanded a revenue cutter, and performed a gallant thing in 1812."

What that "gallant thing" consisted of the closest research has failed to disclose. It is to be regretted, for the sake of history, that that revenue cutter had not been part and parcel of the navy. The subject then would not have been so curtly disposed of, but an account of the action, from the preliminary manœuvres to obtain the weather gauge down to the moment of the enemy striking his colors, preserved.

John Adams has been called the father of the American navy. Under his administration it was made a separate department, and dignified by a secretary of its own. During Washington's administration

the war and navy were one department, and Washington's chief of staff, General Henry Knox, was Secretary.[1]

The name and memory of Alexander Hamilton should be held in deep reverence and gratitude by every officer of the revenue marine. If John Adams was the father of the American navy, Hamilton could justly claim as near a relationship with the revenue marine. It was his brain that first originated the plan of a revenue cutter service; through his efforts the first vessels bearing the revenue flag were launched; and by his recommendation the officers were regularly nominated by the President, confirmed by the Senate, and commissioned precisely as were army and navy officers.

The first step relative to the establishment of the revenue marine service is found in a communication directed to the House of Representatives under date of April 23, 1790, and headed "Operations of the act laying duties on imports." Section 5th contemplates a "provision of boats for securing the collection of the revenue; but no authority to provide them is anywhere given."

After stating the necessity of creating such an establishment, the Secretary submits his estimate. Ten boats, from thirty-six to forty feet keel, were considered amply sufficient to meet the requirements of the young republic.

"Each one to have one captain, one lieutenant, and six mariners, and armed with swivels. The first cost of one of these boats completely equipped may be computed at $1000.

"The following is an estimate of the amount expended:

10 captains	@ $40	$4,800
10 lieutenants	25	3,000
60 seamen	8	5,760
Provision		3,000
Wear and tear		3,000
		$19,560

"The utility of an establishment of this nature must depend on the exertion, vigilance, and fidelity of those to whom the charge of the boats shall be confided. If these are not respectable characters, they will rather serve to screen than detect fraud. To procure such, a liberal compensation must be given, and, in addition to this, it will, in the opinion of the Secretary, be advisable that they be commissioned as officers of the navy. This will not only induce fit men the more readily to engage, but will attach them to their duty by a nicer sense of honor.

"All of which is humbly submitted.

"ALEXANDER HAMILTON,

"Secretary of the Treasury."

On August 4, 1790, the views of the Secretary were adopted with the following alterations, viz., ten vessels were authorized to be built,

[1] An act to establish the Treasury Department. Approved September 2, 1789.

An act to establish an Executive Department, to be denominated the Department of the Navy. Approved April 30, 1798.

containing, each, one master, not more than three mates, four mariners, and two boys.

Master	$30 per month	and subsistence of a captain in the army.
First mate	20 "	Subsistence of a lieutenant in the army.
Second mate	16 "	
Third mate	14 "	
Mariner	8 "	Rations allowed to soldier.
Boy	4 "	

The original vessels built agreeable to the above law were as follows, viz.:

Name of Vessel.	Commander.	Date of Commission.	Rig.	Number of Guns.	Tonnage.
Scammel	Hopeley Yeaton, Master	March 21, 1791.	Schooner.	14	187 tons.
Massachusetts	J. F. Williams, Master	March 21, 1791.	Brig.	14	187 "
Argus	Jonathan Malbis, Master	March 21, 1791.	Schooner.	14	187 "
Vigilant	Patrick Dennis	March 21, 1791.	Schooner.	14	187 "
General Greene	James Montgomery, Master	March 21, 1791.	Sloop.	10	
Active	Simon Grass; David Porter appointed Master August 5, 1792, *vice* Grass	March 21, 1791. August 5, 1792.	Schooner.	14	
Virginia	Richard Taylor, Master	March 21, 1791.	Schooner.	14	187 "
Diligence	William Cook	April 25, 1791.	Schooner.	12	187 "
South Carolina	Robert Cochoran	May 8, 1791.	Schooner.	12	187 "
Pickering			Brig.	14	187 "

Captain J. F. Williams, of the revenue marine, is worthy of special mention. In the spring of 1799, while in command of the "Hazard," 14 guns, he fell in with the "Active," 18 guns, a vessel that is supposed to have belonged to the King of England. The combat lasted half an hour, and was determined in favor of the "Hazard." The "Active" is said to have had thirty-three killed and wounded, and the "Hazard" eight. Shortly afterwards Captain Williams was appointed to the ship "Protector," 20 guns, belonging to the State of Massachusetts, in which he met a heavy letter of marque, called the "Duff"; a ship said to have been quite equal in force to the "Protector." After a sharp contest of more than an hour the "Duff" blew up.

"Commodore Edward Preble is said to have served as a midshipman on board the 'Protector' under the command of Captain Williams, in her hard-fought action with the 'Duff.' Preble is first seen in actual service as the commander of the revenue cutter 'Pickering,' though his rank was that of lieutenant-commandant, and he had been previously attached to the 'Constitution' as one of her officers."[2]

The first co-operation of the revenue cutters with the navy of the United States was in 1798, when Commodore Barry had the command of a large fleet, with orders to cruise on the coast between Nantucket and Cape Henry, and co-operating with this squadron were the revenue

[2] Cooper's Naval History.

cutters "Governor Jay," 14 guns and 70 men, and "General Greene," 10 guns and 54 men, the whole under Barry's command. August 13 of the same year, Captain Nicholson, commanding frigate "Constitution," was ordered to cruise from Cape Henry to our southern limits, with four revenue cutters under his command. This was the maiden cruise of the "Constitution."

In the spring of 1799, in order to protect American commerce from the depredations of French cruisers, the following forces were stationed in the Caribbean Sea. They were to rendezvous at Prince Rupert's Bay, and to cruise to the windward of St. Kitt's as far as Barbadoes and Tobago. The fleet consisted of two frigates, four sloops-of-war, the revenue cutter "Pickering," 14 guns; "Eagle," 14 guns; "Scammel," 14 guns; and "Diligence," 12 guns.

Commodore Truxton, in the "Constellation," was in command of the fleet to rendezvous at St. Kitt's, and to cruise to leeward as far as Porto Rico, paying attention to St. Martin's and the Virgin Gorda. The fleet consisted of four frigates and sloops-of-war, and the revenue cutter "Virginia," 14 guns and 70 men.

To guard the Windward Passage between Cuba and Santa Domingo were the "Ganges," 24 guns, Commodore Tingley, and the revenue cutter "South Carolina."

To cruise in the vicinity of Havana, and to protect the trade between the Moro Castle and Matanzas, were the "Delaware," 20 guns, Commodore Stephen Decatur, and the revenue cutter "General Greene," 10 guns, and the "Governor Jay," 14 guns.

The following prizes were captured by revenue cutters during the French war, viz.:

Revenue cutter "Eagle": "Le Bon Père," 6 guns, 52 men; "Reynard" (in conjunction with the "Delaware," U.S.N.); "Siren," 4 guns, 36 men (in conjunction with the "Delaware," U.S.N.); "Dolphin"; "La Fougeuse," 2 guns, 70 men; "Favorite," 6 guns, 41 men. Revenue cutter "Pickering": "Atalanta"; "La Voltigeuse," 10 guns, 61 men; "Fly," 4 guns; Active," 12 guns, 60 men. Revenue cutter "Scammel": "Félix."

The frigate "Insurgente" and brigantine "Pickering" received orders to sail for Guadaloupe (the "Pickering" having returned to the United States for a short period) and were lost, not a soul surviving the disaster to tell the terrible tale.

The following correspondence will explain itself in relation to the subject, and may be of interest to many:

"NAVY DEPARTMENT, February 8, 1802.

"SIR,—In obedience to the resolution of the House of Representatives of the 2d instant, I herewith transmit copies of the sailing orders given to the commanders of the frigate 'Insurgente' and brigantine 'Pickering.'

"The frigate 'Insurgente' sailed from Baltimore the 22d of July, and from Hampton Roads the 8th of August, 1800. The 'Pickering' sailed from New Castle, August 20, 1800.

"Since the sailing of those vessels no information has been received respecting them. It is presumed, however, that they were lost in the equinoctial gale of September, 1800.

"I have the honor to be, with great respect,

"Sir, your most obedient servant,

"ROBERT SMITH.

"SPEAKER HOUSE OF REPRESENTATIVES."

"NAVY DEPARTMENT, August 15, 1800.

"SIR,—Having already furnished you with all the necessary instructions for the government of your conduct on a cruise, it only remains for me now to direct that, taking under your convoy the provision ship 'Florida,' and such merchant vessels as may be ready to sail with you, and proceed to join our squadron on the Guadaloupe station, rendezvousing at St. Kitt's.

"You will see the 'Florida' safe to St. Kitt's; her cargo is to be delivered to David M. Clarkson, Esq., an agent there, unless you should meet the commanding officer on your passage, by whose orders you will then be governed.

"After performing this service, you will cruise in the vicinity of Guadaloupe until you fall in with Captain Decatur, or the commanding officer of that station, under whose command you are to act until further orders.

"I have the honor to be, sir, your most obedient servant,

"BENJAMIN STODDART.

"LIEUT. BENJAMIN HILLIAR, of the 'Pickering,'
"New Castle, Delaware."

Cooper is authority for stating that "vague rumors were set afloat at the time, and it was even affirmed that the two vessels had run foul of each other in a gale,—a tale that was substantiated by no testimony, and which was probably untrue."

We trust sufficient has been written in this paper to throw at least a ray of light upon the early history of the revenue marine service.

The object and duties of the revenue marine service of to-day may be briefly enumerated as follows, viz.:

"The security of the customs revenue, the assistance of vessels in distress, the enforcement of the neutrality laws, the enforcement of quarantine, the enforcement of the laws governing merchant vessels, the protection of merchant vessels from piratical attacks, the protection of wrecked property, and the prevention of depredations by vessels upon the timber reserves of the United States."

The Secretary of the Treasury assigns stations to the different revenue vessels, determines the number and relative rank of officers, rates and number of petty officers, seamen, and others to be employed on board, and designates the collector under whose superintendence each vessel shall be placed. The cruising-grounds of revenue vessels are designated by the Secretary of the Treasury, and all purchases, repairs, alterations, etc., are only consummated with that official's consent.

It will be seen, upon comparison, that the English coast-guard, or

preventive service, commonly supposed to have been organized more particularly for the suppression of illicit trade, differs widely and materially in all the distinctive features pertaining to the revenue marine.

The coast-guard of England was created not for the purpose of suppressing smuggling, but for the special object of watching the coast, and to give timely warning of the approach of French invading fleets under Napoleon I. The coast was patrolled by night and day with ceaseless vigilance, and a telegraphic system originated through which news could be transmitted with celerity and dispatch. The force is under the direction of the Admiralty of England, and constitutes both a fleet and an army, the former numbering more than a hundred watch vessels and cruisers.

"The coast is divided into districts, each commanded by a captain of the Royal navy, and having a guard-ship at one of its ports. Each district is divided into stations, at each one of which a dozen or so of the guardsmen are lodged. The pay is about the same as that of a man-of-war's man, which the guardsman must have been for seven years, and in which he must have distinguished himself, before he can get into the coast service. They are not admitted after the age of thirty-five years, nor retained after sixty-five, but pensioned (one hundred dollars per annum) after twenty years' service. In case of wreck, after all life is saved, the guardsman is permitted to do duty on his own account as a wrecker, and not a little of the aggregate salvage awards of England are made to the coast-guards.

"Their duties are simple, but often dangerous. The navy cruises along the coast, keeping a lookout for ships in distress, and a sharp eye on suspicious vessels. The force on shore has little to do by day but to walk the beat or district, watch through their telescope the sea and clouds for ships and storms, and to communicate with the next post. At night he watches the light-houses on his beat, securing by this surveillance the faithful execution of the keeper's duties. They man in an emergency the life-boats which are attached to the stations, and are ever forward in volunteering to assist the Royal National Life-boat Institution.

"The latter organization may really be considered a part of the coast-guard service. The coast-guard district commander is a member of the district committee of the institution. Of the seven hundred and twenty-four gold and silver medals of honor issued by the institution since 1824, two hundred and seven were given to coast-guardsmen. More coast-guardsmen wear the Albert medal, given by the queen in person, than men of any other profession, trade, or service."

Among other features of the English system which might be introduced into the revenue marine service with possibly gratifying results, is the pensioning or retiring of superannuated officers and men.

At present the rank and file of America's coast-guardsmen have no

assurance that their service will be retained, even though the best years of youth and manhood have been devoted to the interests of the government and a conscientious discharge of duties arduous in the extreme. There is no incentive, beyond the promptings of a noble heart and nature, to risk life in the rescue of human beings from the perils of the sea. Though they have grown gray in long service, undergone privation, faced danger, and possibly death in the performance of duties pertaining to the revenue marine, there is no guarantee, no provision, no barrier, standing between them and absolute want. When the American coast-guardsman has become incapacitated from performing duty, or successfully passing the rigid scrutiny of the surgeon, his services have lost all value, his time-honored uniform is cast aside or reduced to rags, and the faithful servant, the gallant seaman and trained veteran, who from his very calling becomes unfitted to battle with the world, is discharged, and left to drift through misery, want, and degradation, until death mercifully relieves him from the charities of a Christian community. With the commissioned officer, the situation is infinitely worse than that of the enlisted man, for obvious reasons.

Neither the head of the service, nor those connected with it in any of its branches, can be held accountable for so deplorable a neglect of a corps entitled in all justice, reason, and humanity to the benefits of a retired list fully as much as the army and navy. Only when serving in conjunction with the navy can officers or men of the revenue marine receive a pension, should injuries result during the temporary association.

Brilliant victories and sanguinary engagements do not properly fall to the light-armed and long-heeled revenue cruiser. But there are other victories to be gained and triumphs to be achieved in the cause of humanity, whose laurels are brighter and more lasting than all the bloody trophies won at the cannon's mouth or plucked from grim-visaged war. The rigor and fury of the howling tempest, the blinding snow, ice, and booming breakers, together with the nameless terrors of a lee shore, privation and exposure are cheerfully met by the revenue-cutterman with a devotion and disinterestedness of purpose only excelled by his twin brother and co-operator in danger, the surfman attached to the United States Life-Saving Service.

This organization has for its chief the former efficient head of the revenue marine bureau, and it is owing largely to his executive ability and skill, with the assistance of officers specially selected and detailed from the revenue marine, that this most important branch of the public service has been rescued from obscurity, and purged from all objectionable features, until its high standard of excellence, promptitude, and efficiency places it in rank second to none, not excepting the older organizations of Europe, protected as they are by a hospital and pensioning system not yet in vogue in the new world. It is an institution

reflecting honor and renown upon all connected with it, from the highest official to the brave and hardy surfman.

In 1791 the revenue marine was organized with ten vessels and thirty commissioned officers, at a yearly outlay of nineteen thousand five hundred and sixty dollars. In 1835, the service keeping pace with the increasing growth of commerce and acquisitions of territory, had been augmented to nineteen vessels and seventy-nine commissioned officers, stationed from Eastport, Maine, to New Orleans. The compensation had been increased in proportion, captains receiving $892 per annum; first lieutenants, $712 per annum; second lieutenants, $652 per annum; and third lieutenants, $545 per annum. In 1836 Congress again granted an advance, as follows: captains $1200, and lieutenants $960, $860, and $790, respectively.

Many naval officers have served in the revenue marine, and as late as 1830 the cutter "Rush," stationed at New York, contained Oscar Bullis, Lieutenant U.S.N., commanding; John S. Glassen, Passed Midshipman, first lieutenant; Stephen C. Rowan, Midshipman, second lieutenant.

It was found that officers of the navy were unwilling to perform duties usually assigned to officers attached to revenue cutters, and in consequence the following order was issued:

"CIRCULAR.

"To Officers in the Revenue Cutter Service.

"Treasury Department,
"January 17, 1832.

"Experience having shown that the employment of officers of the navy in the revenue cutter service is liable to objection, it is deemed proper to discontinue the practice, and, in future, to keep the two services separate and distinct.

"In pursuance of this arrangement, and with the approbation of the Secretary of the Navy, all officers of the navy now employed in the revenue cutter service will cease to be so employed after the 30th of April next. And the President has directed that the commissions now held by such officers in the cutter service be revoked,—the revocation to take effect after that day.

"With a view to greater efficiency in the cutter service in future, vacancies will be filled by promotion from among the officers in that service, when that shall be found preferable to other appointments, having regard to fitness as well as seniority.

"Louis McLane,
"Secretary of the Treasury."

It was left optional with the naval officers serving in the cutters to resign or retain their commissions. The following gentlemen preferred to remain, promotions at that period being anything but encouraging: G. A. O'Brien, Henry D. Hunter, W. W. Polk, Daniel Dobbin, William Cordy, William A. Howard, F. Green, T. M. Randolph, Charles B. Childs, Levi C. Harby, John Little, and William Russell.

In the earlier years of the service, officers were permitted to employ their slaves on board in the capacity of stewards, cooks, servants, and

even seamen. The cabins and wardrooms were fitted up at the expense of the officers attached to the cutter. Promotions were not made by seniority, but were obtained as best the applicant could. Officers were not transferred to other vessels or stations, and their original entry into the service generally depended upon the commanding officer and collector of customs, who recommended them to the Secretary of the Treasury. The captain furnished the rations for the crew, kept the pay-rolls, and was the disbursing officer. But in 1832 the service was reorganized, the present system of payments and supplies adopted, and many abuses corrected.

The uniform prescribed by Mr. Ingham in 1832 was bitterly opposed by the officers. It may be briefly described as follows: the hat was of the present silk or stovepipe pattern, with a black cockade ornamented by a brass button on the left side. Blue dress-coat with pipings of yellow cord on every seam; buttons on cuffs, nine on each lapel, four on each pocket-flap, and four on the skirts. A captain wore two epaulets, first lieutenant one on right shoulder, second lieutenant one on left shoulder, third lieutenant none. The pattern of buttons then in vogue were stamped with a key and the letters U. S. In 1834 this was changed by omitting the yellow cord, and substituting a cocked hat for the silken tile. But this substitution was not destined to be adopted without further trouble, correspondence, and offense.

In the same year the U. S. frigate "Potomac," Commodore Downs, arrived at Boston from an East Indian cruise. A ball was given to the officers by the citizens, and Captain William A. Howard, U.S.R.M., attended the fête in full uniform. The commodore and his officers soon after forwarded a complaint to Washington to the effect that officers of the revenue marine could not be distinguished by their uniform from officers of the navy. The Honorable Secretary at once ordered a radical change, and for the blue was substituted a serviceable suit of gray, trimmed with black braid, epaulets, and plain cocked hat. Since that date many changes have occurred both as regards cut of uniform and ornaments designating rank. But blue is at present in vogue, and is the only appropriate color for a sea officer.

A fleet of revenue cutters at present patrols the coast from Maine to Texas, consisting of twenty-four steamers, five tugs, two steam-launches, one bark, one schooner, and four sloops.

From 1860 to 1870, and taking the average for these years, the number of vessels assisted was 119; seized and reported for violation of law, 114; miles sailed, 147,599; boarded and examined, 13,098; lives saved, 17.

In 1872, 219 vessels received assistance; 1594 were seized; 166,098 miles sailed; 24,932 vessels boarded and examined; and 17 lives saved.

The increased efficiency and decreased expenses are due to a thorough reorganization effected in 1869 and 1870. A total decrease of tonnage

amounting to 1889 tons was made, and the standard of examinations was raised.

Within a few years the grade of cadet has been created, a schoolship detailed, and every facility furnished, by which the cadet receives both theoretical and practical instruction, enabling him at the expiration of two years to undergo a rigid examination for the grade of third lieutenant.

It requires constant study and application on the part of an officer of the revenue marine to thoroughly master the numerous requirements pertaining to his examinations. But little time can be wasted in frivolity, and his best energies are devoted to the interests of the government by striving to become proficient in all branches of his profession. The yearly expenses are about eight hundred thousand dollars, and for the amount of duty rendered there is no branch or department of the public service more economically or ably administered.

H. D. SMITH,
Lieutenant U.S.R.M.

THE MILITIA OF GREAT BRITAIN.[1]

CONNECTED by common descent as are the citizens of the great republic with the subjects of the sovereign of the British Isles, speaking in the same tongue, being in a friendly relationship the one to the other, those matters which interest us of the old country will doubtless find a like interest in the hearts and minds of you on the grand continent. How much reason have I, then, in assuming that Americans will be interested in what your and our ancestors had a common share in! One thousand years ago—a long time ago in verity—the military force was established that is now known as the militia, and this has always been the only armed body recognized by the constitution of this country. Of this force that eminent man, Henry, Lord Brougham, wrote, in his work on the "British Constitution": "Some of the greatest things ever done by the English army were performed by militia-men drafted into the regular forces and volunteering to serve abroad." Again, in the preface of a book in my possession, published in 1718, entitled "The Militia Law," being a digest of all the acts of Parliament bearing upon the force down to that period, I find these words: "The militia of England is the natural strength, and in its original constitution the great standing army and safeguard of the nation in case of insurrection or rebellion at home or invasion from abroad, and is happily distinguished from other common forces that it is not the nature of the militia as such to be harassed or exposed to any foreign dangers, but to keep and defend the king's peace at home." Let it be noted *en passant* that although the duties pertaining to the militia were and undoubtedly are such as those set forth above, yet in time of need the members of that force, officers and men, have at once stepped forward to bear the toil and danger of war outside the shores of the British Islands. We do not intend to enter into the history of the militia at any length; indeed, it would be impossible, in the limited space of a magazine article, to do more than sketch the subject. In the reigns of King Charles the Second, King William the Third, Queen Anne, the Georges, and our present sovereign lady, various acts of Parliament have been passed for the maintenance and better govern-

[1] By the author of "Two Months with Tchernaieff in Servia," "With the Roumanians in the '77 Campaign," etc.

ment of the militia. From time to time the militia forces have been in a quiescent state, but they have never been entirely lost sight of, and the aristocracy and the gentry of the country have always gladly done their duty as officers, and have never found the working-classes behind them in the display of gallant loyalty, but have always known them to be ready recruits to the ranks of the various county regiments. Unlike the volunteers (who are but in their infancy now, and will, perhaps, never be called upon to do the real work of *soldiers*), the officers and other ranks of the militia have always been paid soldiers, and amenable to military discipline. They have ever been, therefore, and ever will be as long as they exist, ready to take post with an army in the field to assist their brethren of the regular troops in the defense of their country's honor and safety. You Americans and we Britons can look with a like pride at the services rendered by our common ancestors in times long past, and by our mutual connections in days nearer the present. We will not here go farther back than 1756, in which year the militia was reorganized upon the basis on which it now stands. The oldest English and Welsh regiments, as they at present exist, were raised in that year, the Irish militia being established on the new system in 1793, and the Scotch in 1797.

A property qualification within their particular county was necessary for officers of the force, and this was not entirely abolished until so late as 1869. The officers of the militia were, by the act of 1757, to rank with but junior to officers of the same rank in the regular army, —that is to say, a captain in the militia (for example) would take precedence of all lieutenants in the regular army, but would be junior to all of his own grade of captain in the regulars. That rule is still in force. No militia regiment has ever taken active part in a war as a regiment, but the militia has in other ways borne a conspicuous share in the campaigns in which this country has at divers periods of her history been engaged. Officers and private soldiers have on such occasions volunteered their services, and have been transferred from their militia regiments to the line; and the numbers of these reinforcements have been so great that it may be fairly said that without them England could not have held her own against the power of her enemy or enemies. According to the number of volunteers furnished by a regiment in time of war to serve in the field, commissions in the regular army were conferred so many for an ensign, so many for a lieutenant, more for a captain, and still more for a field-officer. These officers, as a rule, were placed on half-pay when the war for which they volunteered their services was concluded. As a proof of the service rendered by militia-men volunteering to the line in war-time, we quote the numbers given to the regulars in this manner in the famous campaigns this country was engaged in from 1805 to 1814 inclusive. In those ten years of stirring events the militia sent to help their brethren

of the line no less than one hundred and ten thousand nine hundred and thirty-two men, an average of eleven thousand one hundred per annum. Had it not been for the loyal devotion of those gallant militiamen England would have found it impossible to cope with the strength of the great Napoleon. The urgent need the regular troops had for these reinforcements will be understood when it is noted that at the battle of Talavera these militia volunteers fought in the uniforms and appointments belonging to their militia regiments, not having had time to change them for those peculiar to the corps they volunteered their services to. In our war with Russia, in 1854, '55, and '56, known as the Crimean war, the militia furnished volunteers for active service just as nobly and promptly as was the case in the Peninsular campaigns.

There is now living in Chester, and long may he continue to live, a gentleman who, as an officer in the regiment I have the honor to serve in, volunteered to the line and bore an honorable part in many of the bloody fights for which the Peninsula was celebrated in the early part of the present century. The services of the militia, so nobly rendered in the Peninsular and Crimean wars, were justly acknowledged by British statesmen. At the time of the first mentioned, Lord Castlereagh (the Secretary of State for Foreign Affairs), speaking about the militia and the war, said in the Commons House of Parliament that without the voluntary assistance given by the militia "we could not have kept possession of Portugal, or have sent forces to co-operate in the deliverance of the Peninsula at large. . . . Parliament ought always to bear in recollection that it is to the militia we owe the character we at present enjoy in military Europe, and that without the militia we could not have shown that face which we have done in the Peninsula." Relating to the conduct of the militia in the Crimean war, the field-marshal commanding-in-chief the British army, in a general order, dated 9th June, 1856, said, "They have not only performed every duty which fell to their share with the cheerful obedience of good soldiers, but they have, in large numbers, gallantly volunteered into the line at the most critical period of the war; and by thus reinforcing the British army before Sevastopol, have essentially contributed to its success. The field-marshal has received constant reports from general officers, at home and abroad, of the excellent state of discipline of the militia regiments generally, and he desires to express his thanks for their good conduct and his best wishes for their welfare and happiness." The Houses of Lords and Commons unanimously passed votes of thanks to the militia for their loyal and gallant service during the war. Not only did the force contribute volunteers to fill up gaps in the ranks of the line regiments serving in the field during these campaigns, but as many of its corps were embodied for permanent service in the garrisons within the isles and without, in such places as Malta, etc., line regiments were enabled to take the field, and in this way great

service was rendered. I think I have proved beyond doubt that the British militia has been of infinite value,—has done its duty loyally,—and has helped most materially to maintain the prestige of the country. Let me now pass to other matters. We have artillery, engineers, and infantry militia. The artillery does not form one regiment, like the artillery of the regular army, nor is it divided into horse, field, and garrison artillery. The militia artillery is for garrison or coast protection solely, and is apportioned to counties by distinct regiments, just the same as the infantry. There are fifteen artillery militia regiments in England and Wales, five in Scotland, and ten in Ireland. These vary in the number of batteries, and consequently in the number of officers, non-commissioned officers, and men. To each regiment an adjutant is appointed from the regular artillery, who must be a captain. Two or three regiments of engineers have recently been raised, and to them captains have been told off to serve as adjutants from the regular engineers. The infantry regiments are one hundred and twenty-three in number, and with few exceptions consist of one battalion only. Eleven of these regiments are Scotch, thirty-three Irish, and the remainder are English and Welsh. Three of the infantry regiments have fourteen companies, fourteen have twelve, twenty-four have ten, fifty-nine have eight, fifteen have six, three have five, and five have four. A company in the British service numbers a hundred rank and file on a proper footing in war-time, and although the militia is not on a war strength at present, yet it would not require much recruiting to bring it up to its full complement. The officers consist of an honorary colonel, a lieutenant-colonel, majors (two generally), a captain to each company, a subaltern to each company and a second to every other company, a surgeon, quartermaster, and an adjutant. Many of the officers have served in the line; the adjutant is a captain of the line regiment with which the militia regiment is brigaded.

I should say *en passant* that the adjutants appointed to the militia serve in that capacity for five years only, when they are *seconded* in their regiments, and after their term is finished revert to the corps from which they came. The lieutenant-colonel, the majors, and the adjutant are mounted officers. The instructor of musketry must be a subaltern officer, and must have taken a first-class certificate at the school of musketry at Hythe. A certain number of sergeants are appointed to each company or battery who have served with unexceptional good conduct in the regular army, and to each company there are also so many sergeants and corporals who are promoted from the ranks of the militia. The first mentioned are styled staff-sergeants, and are on permanent duty; the latter are called volunteer-sergeants, and only attend when their regiment is up for training. The militia are clothed exactly the same as the regular troops, excepting that silver lace, braid, and buttons are worn instead of gold. Formerly the line and militia wore gold

and silver indiscriminately, but in latter years the gold has been worn only by the line and the silver by the militia. The artillery wear blue tunics with scarlet collars, blue trousers with a broad scarlet stripe down each outward seam, and are armed (the rank and file) with carbine and sword-bayonet; the engineers have scarlet tunics with blue velvet collars and cuffs, and trousers like the artillery; the infantry, being divided into Highlanders, fusileers, rifles, light infantry, and ordinary "marching" regiments, wear the dress peculiar to each branch: the rifles in green, the Highlanders in their picturesque Scotch costume, and the other corps in scarlet tunics with collars and cuffs of divers colors,—trousers, blue with narrow red stripes, and either the helmet or the busby, according as they are or are not fusileers. The rank and file of the infantry are armed with the Snider rifle and bayonet. Artillery engineers and rifles do not have regimental or queen's colors, but the other regiments have each a pair of colors. There are a certain number of drummers, buglers, and fifers, under the charge of a band non-commissioned officer, who are on the permanent staff, and live in the regimental barracks. Officers and men receive the same pay as those of the regular army, and certain allowances,—as, for example, each officer receives four shillings a day mess allowance, and two shillings and threepence for lodging. Field-officers draw forage allowance. The period of annual training is one month, and from six weeks to twelve weeks additional training for recruits. The men are either quartered in barracks or in billets, and draw rations daily. The average daily drill on parade is an hour in the morning before breakfast (under the direction of the adjutant, at which all officers junior to the adjutant attend), from an hour and a half to two hours before midday, and in the afternoon the same; on both these parades all officers appear. After each parade a non-commissioned officer drills any defaulters there may be for an hour, or whatever period of time may have been awarded as a punishment.

The officers maintain an expensive mess, and entertain frequently. It is almost impossible for an officer to live on his pay and allowances, but, as they are generally well off, it will be some time yet before the majority of the officers will see the necessity for reform in expenditure. The dinner-hour varies from seven to eight o'clock. Every day a captain is told off for "duty," and a subaltern. The captain and subaltern "of the day," as they are styled, have no easy time during their tour of duty, as, in addition to the ordinary parades, they have to visit the barrack-rooms, inspect the guards once by day and once by night (the latter cannot be done till after 11 P.M.), walk round the hospital, be present at the issue of rations, attend the breakfasts, dinners, and teas of the men, and collect divers reports, etc. They have to send in a report to the commanding officer when their duties are finished, and woe betide the unfortunate who has failed to carry out his work accord-

ing to the strict letter of martial law! Captains of companies have to attend in the orderly-room every morning, when the commanding officer deals out justice to offenders, or, if the offense be of too serious a nature for his jurisdiction, commits the offender for trial by court-martial. A court-martial may—according whether it be regimental, district, or general—sentence the guilty to any punishment known to the common law of the country up to and including death. Beyond that it is scarcely necessary to say they cannot go, and, of course, such a punishment is never awarded by a military court in England, but I mention it in order to show the extent of the power of a court-martial composed of militia officers. I have seen the recruits turn pale and jump with terror and amazement when the adjutant has been reading the Articles of War to them in rapid tones. To the recruit something of this sort would come to his ears and understanding: "Any soldier found guilty of blowing his nose or sneezing in the ranks shall suffer DEATH, AND any *other* punishment the court may choose to award." Doubtless the miserable recruit would consider death itself sufficient punishment, but I am afraid the fear dies out too quickly to produce a lasting and wholesome effect upon the listener. An officer of militia has to pass certain professional examinations for each step up the ladder of promotion; and if I gave my own experience, I should be but giving a fair sample of the manner in which officers of militia gladly avail themselves of the scanty opportunities afforded them to learn their work.

Shortly after I was gazetted, in July, 1873, I was attached to a line regiment for two months and a half, and passed the examination qualifying me for promotion to lieutenant's rank; then I went through a school of instruction at the Aldershot Camp, and passed for my captaincy, or "company" as it is termed, and afterwards I had a month with another regiment of the regular army. In addition to these extras, I have, with one exception, attended each year the recruit training of my regiment, so that I have not done badly. Many officers are attached to other corps besides their own for training, and so obtain even more military experience than that just detailed. It is true that the British militia-man is rarely an average "good shot," but shooting accurately is not a *sinê quâ non* on the battle-field. I have always noticed that the men best disciplined and more in hand did the most execution in a fight, and I have no doubt that that gallant soldier, that accomplished author, and that perfect gentleman, your countryman, Major-General Upton, whom I had the pleasure of knowing in Servia, when he was making a tour of inspection of foreign armies, will bear me out in the above experience. The militia is undoubtedly a well-disciplined force; I don't say it could not be improved in that respect, but I am certain that a couple of weeks in the camp or bivouac would render my brethren in arms capable of taking their place as regiments

in line of battle with their regular fellows. Above everything, they are *willing* to do anything required of them, and only want to be shown how to do it. I would guarantee that my company would follow me to the death, and yet I have never been slack in maintaining strict order and discipline. Treat the militia-man kindly *off* parade, and he will not object to the most severe and exacting discipline being maintained *on* parade. Then again, the average militia-man is not to be despised as a *man;* a company of militia-men will occupy more ground than a company of a line regiment of an equal number of files. The backbone of the British army is, without doubt, the militia, and if the force were once lost now, the British crown would not be long in following. The volunteers take away many men who, if it were not for the existence of that force, would enter the ranks of the militia. This is a great pity, for the volunteers can never be employed on the field of battle, and there are very many good judges who regard them as being for all military purposes perfectly useless. This has never been said, and cannot be said, of the militia. The militia is a useful force in any country. I remember being witness of the valor of the Roumanian militia on more than one occasion in the late war. The capture of the Gravitza redoubt was a feather in the sheepskin caps of those gallant militia-men under the command of Colonel Foty. What were the great Washington's soldiers? We Britishers well know how they fought. And so I say, in bidding you adieu, long life and good health to the militia of the two English-speaking countries, America and Great Britain.

PHILIP H. B. SALUSBRERY,
Captain First Royal Cheshire Light Infantry.

EDITORIAL NOTES.

THE present attitude of Europe with respect to the Turkish question is one of expectancy. Mr. Goschen, the special ambassador sent by England, with the concurrence of the other great powers, to impress upon the Sultan the necessity of performing his obligations under the treaty of Berlin, has entered upon the discharge of the duty assigned him; the plenipotentiaries who met at Berlin on the 16th ultimo to propose a new boundary-line between Greece and the territories of the Porte, have agreed upon a line, have notified their decision to the Porte and to Greece, and have dispersed. It now remains to be seen what the Porte proposes to do about it. The latest advices represent England and France as having agreed to each dispatch a squadron to cruise off the Græco-Turkish coast, and previous advices indicate that the Porte was taking steps to strengthen the defenses of the Dardanelles. It would be premature to express a decided opinion as to the probable result of the complications that are thickening in the east of Europe, but what with the Greek frontier question, the intricate and obscure dispute between the Porte, Montenegro, and the Albanians, and the pressure upon the Porte for the inauguration of reforms and the performance of treaty stipulations, it would seem that a resort to arms was almost inevitable; though exactly how the issue shall be framed, or the parties to it made up, it is yet too early to determine.

THE UNITED SERVICE, while it carefully shuns aught that savors of partisan politics, feels entirely at liberty to congratulate the services on the character of the Presidential nominations which the two great parties of the country have made. The Army and Navy, in addition to the interest that all good citizens feel in having the great office of President worthily filled, have an especial interest in the subject owing to the President's constitutional relation to them as commander-in-chief. On account of this relation they have reason to be pleased when the suffrages of the people raise to the Presidential office one whose antecedents have involved sufficient military experience to enable him to comprehend and sympathize with the wants and interests of the services, which, though differing in their spheres of operation, are alike in the general principles of their constitution and action. General Garfield, while more distinctively a statesman than a soldier yet had a most

honorable military career, in which his performance of duty was marked by the same high qualities of head and heart which have won him fame as a legislator, and the affectionate regard of his associates and acquaintances in every walk of life.

His distinguished competitor in the Presidential race, General Hancock, is the *beau ideal* of the highest type of soldierly excellence. But he is by no means the mere soldier. Natural mental inclination, stimulated by a keen appreciation of the true office of the soldier in a republic, has led him to study profoundly the principles that underlie the structure of our government, and given him a degree of civil acumen which, should he be elected, will make his administration of civil affairs as brilliant as has been his military career.

Whichever, therefore, of these two eminent men shall be inaugurated next March, the Army and Navy have reason to felicitate themselves on the prospect of having not only a creditable administration of the government generally, but in particular an intelligent and sympathetic administration of military and naval affairs.

ACCORDING to the plan adopted in 1876 by the French *Conseil des Travaux*, or Naval Board of Construction, and to be completed by 1885, the French navy is to consist of sixteen ironclads of the first rate, carrying 13½-inch guns; twelve of the second rate, carrying 12¾-inch guns; twenty iron coast-defense vessels, carrying 13½-inch guns; thirty-four cruisers, carrying 5½- and 9½-inch guns; thirty-two gunboats, carrying 6½-inch guns; eighteen dispatch-vessels, carrying 5½- and 7¾-inch guns; fifteen transports, ten storeships, and sixty miscellaneous vessels. The primary object aimed at by the French in this reconstruction is to equip their vessels with the heaviest possible batteries and give them the highest possible speed, their armoring being but a secondary consideration. The vessels are to have a speed of from fifteen to seventeen knots, and the plating, which varies from fifteen to twenty-two inches, extends in many cases only along the water-line, the upper works, except where there are barbette towers, being generally left unarmored. They are nearly all built with powerful rams, while from each quarter a new-style torpedo is slung. It is intended that this torpedo shall be lowered in action, and by manœuvring so as to get the enemy under the stern the torpedo can be brought into play. The dispatch-boats, which are two hundred feet in length at the water-line, displace eight hundred tons, have engines of eight hundred horse-power, and steam twelve or thirteen knots an hour, are very strongly built of wood, with water-tight compartments, and with long, ram-shaped, solid bows, the intention being that they will not stop to fight an enemy, but will run her down.

In the June number of THE UNITED SERVICE we commented upon the high degree of efficiency which has been reached by the Eleventh Brigade, N.Y.S.N.G. Since then, through the courtesy of Major A. D. Hepburn, Inspector First Brigade, N. G. Pa., we have come into possession of information respecting this latter organization which enables us to say—and we say it with sincere pleasure—that Pennsylvania as well as New York has a militia brigade which may well stand for a model not only to other organizations in Pennsylvania, but to similar bodies throughout the country. Two of the subdivisions of this brigade,—the First Regiment and the Battalion of State Fencibles,—which have long been the pride of Philadelphia, recently visited New York, and the impression which they made on the critical and competent judges under whose observation they came in that metropolis may be inferred from the following, which we quote from the *Army and Navy Journal* of June 5. Speaking of the First Regiment, it says:

"The marching, alignments, and distances of the several companies were splendid, and well deserved the repeated rounds of applause." . . . "Philadelphia may well feel proud in owning such a splendid organization as the First; it will bear comparison with any in New York State." Of the State Fencibles the same paper says that they "made a magnificent appearance, ranks well closed, step perfect, alignments and salutes of the very best. The passage of the battalion was a shade the best of the day. The organization is a credit to its State."

Careful reading of Major Hepburn's annual report as brigade inspector discloses the fact that in the First Brigade, at least, inspections have come to mean something more than they did formerly, when a general parade and muster of the troops was about all they amounted to. We have not now the space necessary to enable us to particularize the points of this report which we should like to comment upon, but must content ourselves with saying that the system pursued by Major Hepburn in the performance of his duty as inspector is well worthy the attentive study of every officer of the national guard who is interested in its improvement.

A REMARKABLE case of official deception has recently been brought to light in Russian naval circles. According to the accounts received, Captain Baranoff, naval aide-de-camp to the Czar, who commanded the steam corvette "Vesta" during the late Russo-Turkish war, reported at that time having had an engagement in the Black Sea with the Turkish man-of-war "Fedji-Bulend," in which the "Vesta" won a brilliant victory. For this Captain Baranoff and those under his command received "unprecedented rewards and distinctions from both the Russian people and the Czar," and the captain received decorations from

the Emperor of Germany and the Shah of Persia. Suddenly all Russia was startled by a series of published articles, written by Lieutenant Roshdestvensky, second officer of the "Vesta," declaring that the reported fight was all a myth, and that the "Vesta" had saved herself from capture only by a hasty flight. The captain's sublime effrontery was now displayed. He had his lieutenant brought before a naval tribunal on a charge of making false statements. The court dismissed the charge; but, strangely enough, did not prefer a similar one against the captain, who thereupon appealed to the Ministry of Marine, complaining of the decision of the tribunal, and accusing them of prejudice in his case. The result of the appeal was that Captain Baranoff was himself ordered to be tried by a court-martial, according to the sentence of which he was dismissed the service in disgrace two months ago. This illustrious forger of a report, the true facts of which—so many being in the secret—must have come to light very soon, is forty-two years old, and had no fewer than nine Russian and four foreign orders.

REFERRING to the article on "Education in the Army," by Chaplain Mullins, in the April number of THE UNITED SERVICE, Sergeant Patrick Sheridan, Company I, Twentieth Infantry, takes exception to the statement made in that article that the mass of the enlisted men of the army are illiterate, and sends us a communication controverting that idea. The sergeant's article, which is rather too brief for insertion in the body of the magazine, is yet so well expressed that we give it place here. He says:

"The writer cannot reconcile the assertion made recently in THE UNITED SERVICE by an essayist, to the effect that the majority of the enlisted men of the army are illiterate, with what he has seen himself during the last decade of years which he has been in the army. The fact is that there are very few men in the army who cannot read and write, and I suppose that a man who can read and write is not totally illiterate. The colored troops are, or were, no doubt, illiterate, and it would be hard to expect it to be otherwise, but it does not follow by any means that the white troops are in the same condition.

"A recruiting depot is about one of the worst criterions that I know of to judge the army by, inasmuch as not more than fifty per cent. of the recruits which are sent from it ever become soldiers in the proper sense of the word,—that is, about one half of each detachment of recruits which a regiment receives demonstrate their unfitness to be soldiers in one or at most two years. An idle, incorrigible man has no place in the United States army, and any one who thinks different makes a great mistake. It is true that such a man may serve for a short time, but eventually he will be kicked out.

"As regards the establishment of schools in the army there can be but one opinion, and that is, that it is a step in the right direction. But as the majority of the army have got the rudiments of an education, and as there are to be no more married soldiers, hence no children, it follows that we want something more than mere primary schools. In fact, we want schools where young men can make themselves proficient in grammar, geography, mathematics, and history, and where non-commissioned officers could be taught the duties pertaining to their rank.

"This school should be presided over by a commissioned officer, designated for this particular duty, who should have under him a competent teacher or teachers, according to the size of the post, and it should be compulsory, at least, for the non-commissioned officers to attend until they attain a certain standard. The government allows commissioned officers as instructors at civil colleges, and there is no good reason why it could not do as much for the military posts.

"I believe that in point of intelligence the United States army will compare favorably with any army in the world, but considering that it is employed to protect and enforce the mandates of the best, the freest, and most powerful government in the world, it ought to be the best and most intelligent army in the world."

It is due to Lieutenant Schroeder, with whose article on "Collisions at Sea" this number of The United Service opens, to say that it was written in August, 1879, but owing to the press of other matter, which seemed to demand more immediate publication, was held back by us, and that since the table of contents of this number was made up we have received a note from him asking to withdraw the article. To the lateness of the receipt of Lieutenant Schroeder's note our readers owe it that we are enabled to lay before them his able and (notwithstanding its delayed publication) his very timely paper on a subject which recent events have brought vividly to the attention of the public.

The table of contents of The United Service for September will include, among others, articles on Capt. Pierce's Translation of Virgil, by Major-General Howard; Progress of Torpedo Warfare, by Lieutenant-Commander Barber; Gustavus Adolphus, by General De Peyster; Man-of-War Life Two Hundred Years Ago, by Medical Director Shippen; The Trials of Staff-Officers, by Captain Charles King, U.S.A.; Ship-Building, by A Naval Officer; The Question of Lineal Promotion, by Captain Henry Romeyn, U.S.A.; and a Review of "Cooke's Ordnance," by Professor John M. Brooke.

SERVICE LITERATURE.

THE "HISTORY OF THE ZULU WAR" (Chapman & Hall, London) has just made its appearance, but, from the fact that it is written by a daughter of Bishop Colenso, is somewhat one-sided. It is true that Miss Colenso points out that she had no opportunity of consulting her father, or that the bishop saw neither manuscript nor proofs. Yet, if one cannot find the bishop in the letter, he most undoubtedly appears in the spirit. The book, nevertheless, has its merits, and its military portion has been capably written by Lieutenant-Colonel Edward Durnford, whose brother fell at Isandula.

ENGINEER-IN-CHIEF SHOCK, U.S.N., is to be congratulated on the completion of his important book upon "Steam-Boilers: their Design, Construction, and Management." Mr. Shock has been engaged for several years in the preparation of this volume, and experts who have examined advance sheets speak in high terms of the thoroughness with which this able and zealous officer has performed his self-imposed task.

THE eighth volume of the "Wellington Dispatches" has recently been published by John Murray, of London. In one of his dispatches the duke takes strong ground in favor of corporal punishment in the British army, saying in effect that without flogging it is impossible to preserve discipline.

A. WILLIAMS & CO., of Boston, announce that on August 1 they will issue Chief Engineer King's anxiously-expected work on "The War Ships and Navies of the World;" and the importance of this book, which we have several times referred to in Service Literature, may be learned from the following extract from the author's circular:

"This work will contain correct descriptions of all the modern war ships built and building, with dimensions and particulars, and accompanied with effective drawings, showing the design, proportions, and plan of the ships, and the disposition of their batteries. An interesting comparison is made between the fighting powers of the British and French navies. The powers and dimensions of the great guns now in use or in process of manufacture are exhibited by drawings and descriptions. There are additional chapters upon marine engines and boilers, torpedoes, and the methods of torpedo warfare, with drawings and descriptions of the latest torpedo-boats.

"The writer has enjoyed exceptional facilities for obtaining the information contained in the book, by personal inspection in most cases, supplemented by friendly relations and correspondence with constructors, manufacturers, and others."

That Mr. King wields an able pen the readers of THE UNITED SERVICE have long since discovered, and the advance chapters of his new book which have heretofore appeared in THE UNITED SERVICE show conclusively that this volume is worthy of generous support. The book will be published at the author's expense and risk, and sold only by subscription, at $6.00 per copy.

MR. T. H. S. HAMERSLY, of Washington, D. C., who is preparing a complete Army Register from 1779 to 1880, has just issued an abstract therefrom, compiled by Brevet Lieutenant-Colonel Robert H. Hall, Adjutant of the Military Academy, containing the names of all cadets admitted to the Academy from the time of its establishment to the present year. It contains also tables showing the results of the examinations for admission, and the corps to which the graduates have been promoted.

C. W. CALKINS & CO., of Boston, have published a handsome volume entitled "The Story of the Thirty-Second Regiment Massachusetts Infantry. Whence it came; where it went; what it saw; and what it did." It is written by Colonel Francis J. Parker, and is an interesting and valuable contribution to the literature of the late war.